



## SEQUENCE LISTING

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<120> MICROORGANISMS AND ASSAYS FOR THE IDENTIFICATION OF  
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<130> OGZ-001

<140> 09/813,453

<141> 2001-03-20

<150> US 60/227,860

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<151> 2000-09-21

<160> 77

<170> PatentIn Ver. 2.0

<210> 1

<211> 777

<212> DNA

<213> Bacillus subtilis

<220>

<221> CDS

<222> (1)..(774)

<400> 1

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Leu Leu Leu Val Ile Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val	
1 5 10 15	
tat cat gat gga aaa tta gaa tat cac tgg cgt ata gaa aca agc agg	96
Tyr His Asp Gly Lys Leu Glu Tyr His Trp Arg Ile Glu Thr Ser Arg	
20 25 30	
cat aaa aca gaa gat gag ttt ggg atg att ttg cgc tcc tta ttt gat	144
His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp	
35 40 45	
cac tcc ggg ctt atg ttt gaa cag ata gat ggc att att att tcg tca	192
His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser	
50 55 60	
gta gtg ccg cca atc atg ttt gcg tta gaa aga atg tgc aca aaa tac	240
Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr	
65 70 75 80	
ttt cat atc gag cct caa att gtt ggt cca ggt atg aaa acc ggt tta	288
Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu	
85 90 95	

aat ata aaa tat gac aat ccg aaa gaa gta ggg gca gac aga atc gta	336
Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val	
100 105 110	
aat gct gtc gct gcg ata cac ttg tac ggc aat cca tta att gtt gtc	384
Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val	
115 120 125	
gat ttc gga acc gcc aca acg tac tgc tat att gat gaa aac aaa caa	432
Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln	
130 135 140	
tac atg ggc ggg gcg att gcc cct ggg att aca att tcg aca gag gcg	480
Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala	
145 150 155 160	
ctt tac tcg cgt gca gca aag ctt cct cgt atc gaa atc acc cgg ccc	528
Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro	
165 170 175	
gac aat att atc gga aaa aac act gtt agc gcg atg caa tct gga att	576
Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile	
180 185 190	
tta ttt ggc tat gtc ggc caa gtg gaa gga atc gtt aag cga atg aaa	624
Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys	
195 200 205	
tgg cag gca aaa cag gac ctc aag gtc att gcg aca gga ggc ctg gcg	672
Trp Gln Ala Lys Gln Asp Leu Lys Val Ile Ala Thr Gly Gly Leu Ala	
210 215 220	
ccg ctc att gcg aac gaa tca gat tgt ata gac atc gtt gat cca ttc	720
Pro Leu Ile Ala Asn Glu Ser Asp Cys Ile Asp Ile Val Asp Pro Phe	
225 230 235 240	
tta acc cta aaa ggg ctg gaa ttg att tat gaa aga aac cgc gta gga	768
Leu Thr Leu Lys Gly Leu Glu Leu Ile Tyr Glu Arg Asn Arg Val Gly	
245 250 255	
agt gta tag	777
Ser Val	

<210> 2  
 <211> 258  
 <212> PRT  
 <213> Bacillus subtilis

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 Tyr His Asp Gly Lys Leu Glu Tyr His Trp Arg Ile Glu Thr Ser Arg  
 20 25 30

His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp  
 35 40 45  
 His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser  
 50 55 60  
 Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr  
 65 70 75 80  
 Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu  
 85 90 95  
 Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val  
 100 105 110  
 Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val  
 115 120 125  
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln  
 130 135 140  
 Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala  
 145 150 155 160  
 Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro  
 165 170 175  
 Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile  
 180 185 190  
 Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys  
 195 200 205  
 Trp Gln Ala Lys Gln Asp Leu Lys Val Ile Ala Thr Gly Gly Leu Ala  
 210 215 220  
 Pro Leu Ile Ala Asn Glu Ser Asp Cys Ile Asp Ile Val Asp Pro Phe  
 225 230 235 240  
 Leu Thr Leu Lys Gly Leu Glu Leu Ile Tyr Glu Arg Asn Arg Val Gly  
 245 250 255  
 Ser Val

<210> 3  
 <211> 250  
 <212> PRT  
 <213> Clostridium acetobutylicum

<400> 3  
 Asn Lys Arg Ala Ala Phe Met Leu Leu Leu Phe Leu Arg Ser Val Leu  
 1 5 10 15  
 Lys Val Ile Leu Val Leu Asp Val Gly Asn Thr Asn Ile Val Leu Gly  
 20 25 30

Ile Tyr Asn Asp Thr Lys Leu Thr Ala Glu Trp Arg Leu Ser Thr Asp  
           35                          40                          45  
 Val Leu Arg Ser Ala Asp Glu Tyr Gly Ile Gln Val Met Asn Leu Phe  
           50                          55                          60  
 Gln Gln Asp Lys Leu Asp Pro Thr Leu Val Glu Gly Val Ile Ile Ser  
       65                          70                          75                          80  
 Ser Val Val Pro Asn Ile Met Tyr Ser Leu Glu His Met Ile Arg Lys  
                           85                          90                          95  
 Tyr Phe Lys Ile Asn Pro Leu Val Val Gly Pro Gly Ile Lys Thr Gly  
                   100                          105                          110  
 Ile Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile  
           115                          120                          125  
 Val Asn Ala Val Ala Ala His Glu Ile Tyr Lys Arg Ser Leu Ile Ile  
       130                          135                          140  
 Ile Asp Phe Gly Thr Ala Thr Thr Phe Cys Ala Val Arg Glu Asn Gly  
 145                          150                          155                          160  
 Asp Tyr Leu Gly Gly Ala Ile Cys Pro Gly Ile Lys Val Ser Ser Glu  
                   165                          170                          175  
 Ala Leu Phe Glu Lys Ala Ala Lys Leu Pro Arg Val Glu Leu Ile Lys  
                   180                          185                          190  
 Pro Ala Tyr Ala Ile Cys Lys Asn Thr Ile Ser Ser Ile Gln Ser Gly  
           195                          200                          205  
 Ile Val Tyr Arg Tyr Leu Arg Gln Val Lys Tyr Leu Phe Glu Lys Leu  
       210                          215                          220  
 Lys Glu Asn Leu Pro Asp Gly Arg Arg Thr Arg Thr Ser Leu Val Leu  
 225                          230                          235                          240  
 Ala Thr Gly Gly Leu Ala Lys Leu Ile Asn  
                   245                          250

<210> 4  
 <211> 265  
 <212> PRT  
 <213> Streptomyces coelicolor

<400> 4  
 Met Leu Leu Thr Ile Asp Val Gly Asn Thr His Thr Val Leu Gly Leu  
   1                          5                          10                          15  
 Phe Asp Gly Glu Asp Ile Val Glu His Trp Arg Ile Ser Thr Asp Ser  
           20                          25                          30  
 Arg Arg Thr Ala Asp Glu Leu Ala Val Leu Leu Gln Gly Leu Met Gly

35					40					45					
Met	His	Pro	Leu	Leu	Gly	Asp	Glu	Leu	Gly	Asp	Gly	Ile	Asp	Gly	Ile
	50					55					60				
Ala	Ile	Cys	Ala	Thr	Val	Pro	Ser	Val	Leu	His	Glu	Leu	Arg	Glu	Val
65					70					75					80
Thr	Arg	Arg	Tyr	Tyr	Gly	Asp	Val	Pro	Ala	Val	Leu	Val	Glu	Pro	Gly
				85					90					95	
Val	Lys	Thr	Gly	Val	Pro	Ile	Leu	Thr	Asp	His	Pro	Lys	Glu	Val	Gly
			100					105					110		
Ala	Asp	Arg	Ile	Ile	Asn	Ala	Val	Ala	Ala	Val	Glu	Leu	Tyr	Gly	Gly
		115					120					125			
Pro	Ala	Ile	Val	Val	Asp	Phe	Gly	Thr	Ala	Thr	Thr	Phe	Asp	Ala	Val
	130					135					140				
Ser	Ala	Arg	Gly	Glu	Tyr	Ile	Gly	Gly	Val	Ile	Ala	Pro	Gly	Ile	Glu
145					150					155					160
Ile	Ser	Val	Glu	Ala	Leu	Gly	Val	Lys	Gly	Ala	Gln	Leu	Arg	Lys	Ile
			165						170					175	
Glu	Val	Ala	Arg	Pro	Arg	Ser	Val	Ile	Gly	Lys	Asn	Thr	Val	Glu	Ala
			180					185					190		
Met	Gln	Ser	Gly	Ile	Val	Tyr	Gly	Phe	Ala	Gly	Gln	Val	Asp	Gly	Val
		195					200					205			
Val	Asn	Arg	Met	Ala	Arg	Glu	Leu	Ala	Asp	Asp	Pro	Asp	Asp	Val	Thr
	210					215					220				
Val	Ile	Ala	Thr	Gly	Gly	Leu	Ala	Pro	Met	Val	Leu	Gly	Glu	Ser	Ser
225					230					235					240
Val	Ile	Asp	Glu	His	Glu	Pro	Trp	Leu	Thr	Leu	Met	Gly	Leu	Arg	Leu
				245					250					255	
Val	Tyr	Glu	Arg	Asn	Val	Ser	Arg	Met							
			260					265							

<210> 5  
 <211> 272  
 <212> PRT  
 <213> Mycobacterium tuberculosis

<400> 5  
 Met Leu Leu Ala Ile Asp Val Arg Asn Thr His Thr Val Val Gly Leu  
 1 5 10 15  
 Leu Ser Gly Met Lys Glu His Ala Lys Val Val Gln Gln Trp Arg Ile  
 20 25 30

Arg Thr Glu Ser Glu Val Thr Ala Asp Glu Leu Ala Leu Thr Ile Asp  
 35 40 45  
 Gly Leu Ile Gly Glu Asp Ser Glu Arg Leu Thr Gly Thr Ala Ala Leu  
 50 55 60  
 Ser Thr Val Pro Ser Val Leu His Glu Val Arg Ile Met Leu Asp Gln  
 65 70 75 80  
 Tyr Trp Pro Ser Val Pro His Val Leu Ile Glu Pro Gly Val Arg Thr  
 85 90 95  
 Gly Ile Pro Leu Leu Val Asp Asn Pro Lys Glu Val Gly Ala Asp Arg  
 100 105 110  
 Ile Val Asn Cys Leu Ala Ala Tyr Asp Arg Phe Arg Lys Ala Ala Ile  
 115 120 125  
 Val Val Asp Phe Gly Ser Ser Ile Cys Val Asp Val Val Ser Ala Lys  
 130 135 140  
 Gly Glu Phe Leu Gly Gly Ala Ile Ala Pro Gly Val Gln Val Ser Ser  
 145 150 155 160  
 Asp Ala Ala Ala Ala Arg Ser Ala Ala Leu Arg Arg Val Glu Leu Ala  
 165 170 175  
 Arg Pro Arg Ser Val Val Gly Lys Asn Thr Val Glu Cys Met Gln Ala  
 180 185 190  
 Gly Ala Val Phe Gly Phe Ala Gly Leu Val Asp Gly Leu Val Gly Arg  
 195 200 205  
 Ile Arg Glu Asp Val Ser Gly Phe Ser Val Asp His Asp Val Ala Ile  
 210 215 220  
 Val Ala Thr Gly His Thr Ala Pro Leu Leu Leu Pro Glu Leu His Thr  
 225 230 235 240  
 Val Asp His Tyr Asp Gln His Leu Thr Leu Gln Gly Leu Arg Leu Val  
 245 250 255  
 Phe Glu Arg Asn Leu Glu Val Gln Arg Gly Arg Leu Lys Thr Ala Arg  
 260 265 270

<210> 6

<211> 258

<212> PRT

<213> Rhodobacter capsulatus

<400> 6

Met Leu Leu Cys Ile Asp Cys Gly Asn Thr Asn Thr Val Phe Ser Val  
 1 5 10 15

Trp Asp Gly Thr Asp Phe Ala Ala Thr Trp Arg Ile Ala Thr Asp His  
 20 25 30

Arg Arg Thr Ala Asp Glu Tyr Phe Val Trp Leu Asn Thr Leu Met Gln  
           35                          40                          45  
 Leu Lys Gly Leu Gln Gly Arg Ile Ser Glu Ala Ile Ile Ser Ser Thr  
           50                          55                          60  
 Ala Pro Arg Val Val Phe Asn Leu Arg Val Leu Cys Asn Arg Tyr Phe  
           65                          70                          75                          80  
 Asp Cys Arg Pro Tyr Val Val Gly Lys Pro Gly Cys Glu Leu Pro Val  
                           85                          90                          95  
 Ala Pro Arg Val Asp Pro Gly Thr Thr Val Gly Pro Asp Arg Leu Val  
                           100                          105                          110  
 Asn Thr Val Ala Gly Tyr Asp Arg His Gly Gly Asp Leu Ile Val Val  
           115                          120                          125  
 Asp Phe Gly Thr Ala Thr Thr Phe Asp Val Val Ala Pro Asp Gly Ala  
           130                          135                          140  
 Tyr Ile Gly Gly Val Ile Ala Pro Gly Val Asn Leu Ser Leu Glu Ala  
   145                          150                          155                          160  
 Leu His Met Ala Ala Ala Ala Leu Pro His Val Asp Val Thr Lys Pro  
                           165                          170                          175  
 Gln Gly Val Ile Gly Thr Asn Thr Val Ala Cys Ile Gln Ser Gly Val  
                           180                          185                          190  
 Tyr Trp Gly Tyr Ile Gly Leu Val Glu Gly Ile Val Arg Gln Ile Arg  
           195                          200                          205  
 Met Glu Arg Asp Arg Pro Met Lys Val Ile Ala Thr Gly Gly Leu Ala  
           210                          215                          220  
 Ser Leu Phe Asp Leu Gly Phe Asp Leu Phe Asp Lys Val Glu Asp Asp  
   225                          230                          235                          240  
 Leu Thr Met His Gly Leu Arg Leu Ile Phe Asp Tyr Asn Lys Gly Leu  
                           245                          250                          255

Gly Ala

<210> 7

<211> 255

<212> PRT

<213> Geobacter sulfurreducens

<400> 7

Met Leu Leu Val Ile Asp Val Gly Asn Thr Asn Ile Val Leu Gly Ile  
   1                          5                          10                          15

Tyr Asp Gly Glu Arg Leu Val Arg Asp Trp Arg Val Ser Thr Asp Lys

20	25	30
Ala Arg Thr Thr Asp Glu Tyr Gly Ile Leu Ile Asn Glu Leu Phe Arg		
35	40	45
Leu Ala Gly Leu Gly Leu Asp Gln Ile Arg Ala Val Ile Ile Ser Ser		
50	55	60
Val Val Pro Pro Leu Thr Gly Val Leu Glu Arg Leu Ser Leu Gly Tyr		
65	70	75
Phe Gly Met Arg Pro Leu Val Val Gly Pro Gly Ile Lys Thr Gly Met		
85	90	95
Pro Ile Gln Tyr Asp Asn Pro Arg Glu Val Gly Ala Asp Arg Ile Val		
100	105	110
Asn Ala Val Ala Gly Tyr Glu Lys Tyr Arg Thr Ser Leu Ile Ile Val		
115	120	125
Asp Phe Gly Thr Ala Thr Thr Phe Asp Tyr Val Asn Arg Lys Gly Glu		
130	135	140
Tyr Cys Gly Gly Ala Ile Ala Pro Gly Leu Val Ile Ser Thr Glu Ala		
145	150	155
Leu Phe Gln Arg Ala Ser Lys Leu Pro Arg Val Asp Ile Ile Arg Pro		
165	170	175
Ser Ala Ile Ile Ala Arg Asn Thr Val Asn Ser Met Gln Ala Gly Ile		
180	185	190
Tyr Tyr Gly Tyr Val Gly Leu Val Asp Glu Ile Val Thr Arg Met Lys		
195	200	205
Ala Glu Ser Lys Asp Ala Pro Arg Val Ile Ala Thr Gly Gly Leu Ala		
210	215	220
Ser Leu Ile Ala Pro Glu Ser Lys Thr Ile Glu Ala Val Glu Glu Tyr		
225	230	235
Leu Thr Leu Glu Gly Leu Arg Ile Leu Tyr Glu Arg Asn Arg Glu		
245	250	255

<210> 8  
 <211> 262  
 <212> PRT  
 <213> Deinococcus radiopugnans

<400> 8  
 Met Pro Ala Phe Pro Leu Leu Ala Val Asp Ile Gly Asn Thr Thr Thr  
 1 5 10 15  
 Val Leu Gly Leu Ala Asp Ala Ser Gly Ala Leu Thr His Thr Trp Arg  
 20 25 30



Ile Arg Thr Asn Arg Glu Met Leu Pro Asp Asp Leu Ala Leu Gln Leu  
 35 40 45

His Gly Leu Phe Thr Leu Ala Gly Ala Pro Ile Pro Arg Ala Ala Val  
 50 55 60

Leu Ser Ser Val Ala Pro Pro Val Gly Glu Asn Tyr Ala Leu Ala Leu  
 65 70 75 80

Lys Arg His Phe Met Ile Asp Ala Phe Ala Val Ser Ala Glu Asn Leu  
 85 90 95

Pro Asp Val Thr Val Glu Leu Asp Thr Pro Gly Ser Val Gly Ala Asp  
 100 105 110

Arg Leu Cys Asn Leu Phe Gly Ala Glu Lys Tyr Leu Gly Gly Leu Asp  
 115 120 125

Tyr Ala Val Val Val Asp Phe Gly Thr Ser Thr Asn Phe Asp Val Val  
 130 135 140

Gly Arg Gly Arg Arg Phe Leu Gly Gly Ile Leu Ala Thr Gly Ala Gln  
 145 150 155 160

Val Ser Ala Asp Ala Leu Phe Ala Arg Ala Ala Lys Leu Pro Arg Ile  
 165 170 175

Thr Leu Gln Ala Pro Glu Thr Ala Ile Gly Lys Asn Thr Val His Ala  
 180 185 190

Leu Gln Ser Gly Leu Val Phe Gly Tyr Ala Glu Met Val Asp Gly Leu  
 195 200 205

Leu Arg Arg Ile Arg Ala Glu Leu Pro Gly Glu Ala Val Ala Val Ala  
 210 215 220

Thr Gly Gly Phe Ser Arg Thr Val Gln Gly Ile Cys Gln Glu Ile Asp  
 225 230 235 240

Tyr Tyr Asp Glu Thr Leu Thr Leu Arg Gly Leu Val Glu Leu Trp Ala  
 245 250 255

Ser Arg Ser Glu Val Arg  
 260

<210> 9

<211> 246

<212> PRT

<213> Thermotoga maritima

<400> 9

Met Tyr Leu Leu Val Asp Val Gly Asn Thr His Ser Val Phe Ser Ile  
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Thr Glu Asp Gly Lys Thr Phe Arg Arg Trp Arg Leu Ser Thr Gly Val  
 20 25 30  
 Phe Gln Thr Glu Asp Glu Leu Phe Ser His Leu His Pro Leu Leu Gly  
 35 40 45  
 Asp Ala Met Arg Glu Ile Lys Gly Ile Gly Val Ala Ser Val Val Pro  
 50 55 60  
 Thr Gln Asn Thr Val Ile Glu Arg Phe Ser Gln Lys Tyr Phe His Ile  
 65 70 75 80  
 Ser Pro Ile Trp Val Lys Ala Lys Asn Gly Cys Val Lys Trp Asn Val  
 85 90 95  
 Lys Asn Pro Ser Glu Val Gly Ala Asp Arg Val Ala Asn Val Val Ala  
 100 105 110  
 Phe Val Lys Glu Tyr Gly Lys Asn Gly Ile Ile Ile Asp Met Gly Thr  
 115 120 125  
 Ala Thr Thr Val Asp Leu Val Val Asn Gly Ser Tyr Glu Gly Gly Ala  
 130 135 140  
 Ile Leu Pro Gly Phe Phe Met Met Val His Ser Leu Phe Arg Gly Thr  
 145 150 155 160  
 Ala Lys Leu Pro Leu Val Glu Val Lys Pro Ala Asp Phe Val Val Gly  
 165 170 175  
 Lys Asp Thr Glu Glu Asn Ile Arg Leu Gly Val Val Asn Gly Ser Val  
 180 185 190  
 Tyr Ala Leu Glu Gly Ile Ile Gly Arg Ile Lys Glu Val Tyr Gly Asp  
 195 200 205  
 Leu Pro Val Val Leu Thr Gly Gly Gln Ser Lys Ile Val Lys Asp Met  
 210 215 220  
 Ile Lys His Glu Ile Phe Asp Glu Asp Leu Thr Ile Lys Gly Val Tyr  
 225 230 235 240  
 His Phe Cys Phe Gly Asp  
 245

<210> 10  
 <211> 273  
 <212> PRT  
 <213> Treponema pallidum

<400> 10  
 Met Leu Leu Ile Asp Val Gly Asn Ser His Val Val Phe Gly Ile Gln  
 1 5 10 15  
 Gly Glu Asn Gly Gly Arg Val Cys Val Arg Glu Leu Phe Arg Leu Ala  
 20 25 30

Pro Asp Ala Arg Lys Thr Gln Asp Glu Tyr Ser Leu Leu Ile His Ala  
 35 40 45  
 Leu Cys Glu Arg Ala Gly Val Gly Arg Ala Ser Leu Arg Asp Ala Phe  
 50 55 60  
 Ile Ser Ser Val Val Pro Val Leu Thr Lys Thr Ile Ala Asp Ala Val  
 65 70 75 80  
 Ala Gln Ile Ser Gly Val Gln Pro Val Val Phe Gly Pro Trp Ala Tyr  
 85 90 95  
 Glu His Leu Pro Val Arg Ile Pro Glu Pro Val Arg Ala Glu Ile Gly  
 100 105 110  
 Thr Asp Leu Val Ala Asn Ala Val Ala Ala Tyr Val His Phe Arg Ser  
 115 120 125  
 Ala Cys Val Val Val Asp Cys Gly Thr Ala Leu Thr Phe Thr Ala Val  
 130 135 140  
 Asp Gly Thr Gly Leu Ile Gln Gly Val Ala Ile Ala Pro Gly Leu Arg  
 145 150 155 160  
 Thr Ala Val Gln Ser Leu His Thr Gly Thr Ala Gln Leu Pro Leu Val  
 165 170 175  
 Pro Leu Ala Leu Pro Asp Ser Val Leu Gly Lys Asp Thr Thr His Ala  
 180 185 190  
 Val Gln Ala Gly Val Val Arg Gly Thr Leu Phe Val Ile Arg Ala Met  
 195 200 205  
 Ile Ala Gln Cys Gln Lys Glu Leu Gly Cys Arg Cys Ala Ala Val Ile  
 210 215 220  
 Thr Gly Gly Leu Ser Arg Leu Phe Ser Ser Glu Val Asp Phe Pro Pro  
 225 230 235 240  
 Ile Asp Ala Gln Leu Thr Leu Ser Gly Leu Ala His Ile Ala Arg Leu  
 245 250 255  
 Val Pro Thr Ser Leu Leu Pro Pro Ala Thr Val Ser Gly Ser Ser Gly  
 260 265 270

Asn

<210> 11  
 <211> 262  
 <212> PRT  
 <213> *Borrelia burgdorferi*

<400> 11  
 Met Asn Lys Pro Leu Leu Ser Glu Leu Ile Ile Asp Ile Gly Asn Thr  
 1 5 10 15

Ser Ile Ala Phe Ala Leu Phe Lys Asp Asn Gln Val Asn Leu Phe Ile  
                   20                                  25                                  30  
 Lys Met Lys Thr Asn Leu Met Leu Arg Tyr Asp Glu Val Tyr Ser Phe  
                   35                                  40                                  45  
 Phe Glu Glu Asn Phe Asp Phe Asn Val Asn Lys Val Phe Ile Ser Ser  
                   50                                  55                                  60  
 Val Val Pro Ile Leu Asn Glu Thr Phe Lys Asn Val Ile Phe Ser Phe  
                   65                                  70                                  75                                  80  
 Phe Lys Ile Lys Pro Leu Phe Ile Gly Phe Asp Leu Asn Tyr Asp Leu  
                                   85                                  90                                  95  
 Thr Phe Asn Pro Tyr Lys Ser Asp Lys Phe Leu Leu Gly Ser Asp Val  
                                   100                                  105                                  110  
 Phe Ala Asn Leu Val Ala Ala Ile Glu Asn Tyr Ser Phe Glu Asn Val  
                   115                                  120                                  125  
 Leu Val Val Asp Leu Gly Thr Ala Cys Thr Ile Phe Ala Val Ser Arg  
                   130                                  135                                  140  
 Gln Asp Gly Ile Leu Gly Gly Ile Ile Asn Ser Gly Pro Leu Ile Asn  
                   145                                  150                                  155                                  160  
 Phe Asn Ser Leu Leu Asp Asn Ala Tyr Leu Ile Lys Lys Phe Pro Ile  
                                   165                                  170                                  175  
 Ser Thr Pro Asn Asn Leu Leu Glu Arg Thr Thr Ser Gly Ser Val Asn  
                                   180                                  185                                  190  
 Ser Gly Leu Phe Tyr Gln Tyr Lys Tyr Leu Ile Glu Gly Val Tyr Arg  
                   195                                  200                                  205  
 Asp Ile Lys Gln Met Tyr Lys Lys Lys Phe Asn Leu Ile Ile Thr Gly  
                   210                                  215                                  220  
 Gly Asn Ala Asp Leu Ile Leu Ser Leu Ile Glu Ile Glu Phe Ile Phe  
                   225                                  230                                  235                                  240  
 Asn Ile His Leu Thr Val Glu Gly Val Arg Ile Leu Gly Asn Ser Ile  
                                   245                                  250                                  255  
 Asp Phe Lys Phe Val Asn  
                                   260

<210> 12  
 <211> 229  
 <212> PRT  
 <213> Aquifex aeolicus

<400> 12  
 Met Arg Phe Leu Thr Val Asp Val Gly Asn Ser Ser Val Asp Ile Ala

1	5	10	15
Leu Trp Glu Gly Lys Lys Val Lys Asp Phe Leu Lys Leu Ser His Glu	20	25	30
Glu Phe Leu Lys Glu Glu Phe Pro Lys Leu Lys Ala Leu Gly Ile Ser	35	40	45
Val Lys Gln Ser Phe Ser Glu Lys Val Arg Gly Lys Ile Pro Lys Ile	50	55	60
Lys Phe Leu Lys Lys Glu Asn Phe Pro Ile Gln Val Asp Tyr Lys Thr	65	70	75
Pro Glu Thr Leu Gly Thr Asp Arg Val Ala Leu Ala Tyr Ser Ala Lys	85	90	95
Lys Phe Tyr Gly Lys Asn Val Val Val Ile Ser Ala Gly Thr Ala Leu	100	105	110
Val Ile Asp Leu Val Leu Glu Gly Lys Phe Lys Gly Gly Phe Ile Thr	115	120	125
Leu Gly Leu Gly Lys Lys Leu Lys Ile Leu Ser Asp Leu Ala Glu Gly	130	135	140
Ile Pro Glu Phe Phe Pro Glu Glu Val Glu Ile Phe Leu Gly Arg Ser	145	150	155
Thr Arg Glu Cys Val Leu Gly Gly Ala Tyr Arg Glu Ser Thr Glu Phe	165	170	175
Ile Lys Ser Thr Leu Lys Leu Trp Arg Lys Val Phe Lys Arg Lys Phe	180	185	190
Lys Val Val Ile Thr Gly Gly Glu Gly Lys Tyr Phe Ser Lys Phe Gly	195	200	205
Ile Tyr Asp Pro Leu Leu Val His Arg Gly Met Arg Asn Leu Leu Tyr	210	215	220
Leu Tyr His Arg Ile	225		

<210> 13  
 <211> 257  
 <212> PRT  
 <213> Synechocystis sp.

<400> 13  
 Met Glu Thr Ser Lys Pro Gly Cys Gly Leu Ala Leu Asp Asn Asp Lys  
 1 5 10 15  
 Gln Lys Pro Trp Leu Gly Leu Met Ile Gly Asn Ser Arg Leu His Trp  
 20 25 30

Ala	Tyr	Cys	Ser	Gly	Asn	Ala	Pro	Leu	Gln	Thr	Trp	Val	Thr	Asp	Tyr
		35					40					45			
Asn	Pro	Lys	Ser	Ala	Gln	Leu	Pro	Val	Leu	Leu	Gly	Lys	Val	Pro	Leu
	50					55					60				
Met	Leu	Ala	Ser	Val	Val	Pro	Glu	Gln	Thr	Glu	Val	Trp	Arg	Val	Tyr
65					70					75					80
Gln	Pro	Lys	Ile	Leu	Thr	Leu	Lys	Asn	Leu	Pro	Leu	Val	Asn	Leu	Tyr
			85						90					95	
Pro	Ser	Phe	Gly	Ile	Asp	Arg	Ala	Leu	Ala	Gly	Leu	Gly	Thr	Gly	Leu
			100					105					110		
Thr	Tyr	Gly	Phe	Pro	Cys	Leu	Val	Val	Asp	Gly	Gly	Thr	Ala	Leu	Thr
		115					120					125			
Ile	Thr	Gly	Phe	Asp	Gln	Asp	Lys	Lys	Leu	Val	Gly	Gly	Ala	Ile	Leu
	130					135					140				
Pro	Gly	Leu	Gly	Leu	Gln	Leu	Ala	Thr	Leu	Gly	Asp	Arg	Leu	Ala	Ala
145					150					155					160
Leu	Pro	Lys	Leu	Glu	Met	Asp	Gln	Leu	Thr	Glu	Leu	Pro	Asp	Arg	Trp
				165					170					175	
Ala	Leu	Asp	Thr	Pro	Ser	Ala	Ile	Phe	Ser	Gly	Val	Val	Tyr	Gly	Val
			180					185					190		
Leu	Gly	Ala	Leu	Gln	Ser	Tyr	Leu	Gln	Asp	Trp	Gln	Lys	Leu	Phe	Pro
		195					200					205			
Gly	Ala	Ala	Met	Val	Ile	Thr	Gly	Gly	Asp	Gly	Lys	Ile	Leu	His	Gly
	210					215					220				
Phe	Leu	Lys	Glu	His	Ser	Pro	Asn	Leu	Ser	Val	Ala	Trp	Asp	Asp	Asn
225					230					235					240
Leu	Ile	Phe	Leu	Gly	Met	Ala	Ala	Ile	His	His	Gly	Asp	Arg	Pro	Ile
				245					250					255	

Cys

<210> 14

<211> 223

<212> PRT

<213> Helicobacter pylori

<400> 14

Met	Pro	Ala	Arg	Gln	Ser	Phe	Thr	Asp	Leu	Lys	Asn	Leu	Val	Leu	Cys
1				5					10					15	

Asp	Ile	Gly	Asn	Thr	Arg	Ile	His	Phe	Ala	Gln	Asn	Tyr	Gln	Leu	Phe
			20					25					30		

Ser Ser Ala Lys Glu Asp Leu Lys Arg Leu Gly Ile Gln Lys Glu Ile  
           35                          40                          45  
 Phe Tyr Ile Ser Val Asn Glu Glu Asn Glu Lys Ala Leu Leu Asn Cys  
           50                          55                          60  
 Tyr Pro Asn Ala Lys Asn Ile Ala Gly Phe Phe His Leu Glu Thr Asp  
           65                          70                          75                          80  
 Tyr Val Gly Leu Gly Ile Asp Arg Gln Met Ala Cys Leu Ala Val Asn  
                           85                          90                          95  
 Asn Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile Asp Leu Ile  
                           100                          105                          110  
 Lys Glu Gly Lys His Leu Gly Gly Cys Ile Leu Pro Gly Leu Ala Gln  
                           115                          120                          125  
 Tyr Ile His Ala Tyr Lys Lys Ser Ala Lys Ile Leu Glu Gln Pro Phe  
           130                          135                          140  
 Lys Ala Leu Asp Ser Leu Glu Val Leu Pro Lys Ser Thr Arg Asp Ala  
           145                          150                          155                          160  
 Val Asn Tyr Gly Met Val Leu Ser Val Ile Ala Cys Ile Gln His Leu  
                           165                          170                          175  
 Ala Lys Asn Gln Lys Ile Tyr Leu Cys Gly Gly Asp Ala Lys Tyr Leu  
                           180                          185                          190  
 Ser Ala Phe Leu Pro His Ser Val Cys Lys Glu Arg Leu Val Phe Asp  
           195                          200                          205  
 Gly Met Glu Ile Ala Leu Lys Lys Ala Gly Ile Leu Glu Cys Lys  
           210                          215                          220

<210> 15

<211> 267

<212> PRT

<213> Bordetella pertussis

<400> 15

Met Ile Ile Leu Ile Asp Ser Gly Asn Ser Arg Leu Lys Val Gly Trp  
           1                          5                          10                          15  
 Phe Asp Pro Asp Ala Pro Gln Ala Ala Arg Glu Pro Ala Pro Val Ala  
                           20                          25                          30  
 Phe Asp Asn Leu Asp Leu Asp Ala Leu Gly Arg Trp Leu Ala Thr Leu  
           35                          40                          45  
 Pro Arg Arg Pro Gln Arg Ala Leu Gly Val Asn Val Ala Gly Leu Ala  
           50                          55                          60  
 Arg Gly Glu Ala Ile Ala Ala Thr Leu Arg Ala Gly Gly Cys Asp Ile  
           65                          70                          75                          80

Arg Trp Leu Arg Ala Gln Pro Leu Ala Met Gly Leu Arg Asn Gly Tyr  
                     85                    90                    95  
 Arg Asn Pro Asp Gln Leu Gly Ala Asp Arg Trp Ala Cys Met Val Gly  
                     100                    105                    110  
 Val Leu Ala Arg Gln Pro Ser Val His Pro Pro Leu Leu Val Ala Ser  
                     115                    120                    125  
 Phe Gly Thr Ala Thr Thr Leu Asp Thr Ile Gly Pro Asp Asn Val Phe  
                     130                    135                    140  
 Pro Gly Gly Leu Ile Leu Pro Gly Pro Ala Met Met Arg Gly Ala Leu  
                     145                    150                    155                    160  
 Ala Tyr Gly Thr Ala His Leu Pro Leu Ala Asp Gly Leu Val Ala Asp  
                     165                    170                    175  
 Tyr Pro Ile Asp Thr His Gln Ala Ile Ala Ser Gly Ile Ala Ala Ala  
                     180                    185                    190  
 Gln Ala Gly Ala Ile Val Arg Gln Trp Leu Ala Gly Arg Gln Arg Tyr  
                     195                    200                    205  
 Gly Gln Ala Pro Glu Ile Tyr Val Ala Gly Gly Gly Trp Pro Glu Val  
                     210                    215                    220  
 Arg Gln Glu Ala Glu Arg Leu Leu Ala Val Thr Gly Ala Ala Phe Gly  
                     225                    230                    235                    240  
 Ala Thr Pro Gln Pro Thr Tyr Leu Asp Ser Pro Val Leu Asp Gly Leu  
                     245                    250                    255  
 Ala Ala Leu Ala Ala Gln Gly Ala Pro Thr Ala  
                     260                    265

<210> 16  
 <211> 702  
 <212> DNA  
 <213> Bacillus subtilis

<220>  
 <221> CDS  
 <222> (1)..(699)

<400> 16  
 ttg tta ctg gtt atc gat gtg ggg aac acc aat act gta ctt ggt gta 48  
 Met Leu Leu Val Ile Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val  
           1                    5                    10                    15  
 tat cat gat gga aaa tta gaa tat cac tgg cgt ata gaa aca agc agg 96  
 Tyr His Asp Gly Lys Leu Glu Tyr His Trp Arg Ile Glu Thr Ser Arg  
                     20                    25                    30  
 cat aaa aca gaa gat gag ttt ggg atg att ttg cgc tcc tta ttt gat 144



His	Lys	Thr	Glu	Asp	Glu	Phe	Gly	Met	Ile	Leu	Arg	Ser	Leu	Phe	Asp	
		35					40					45				
cac	tcc	ggg	ctt	atg	ttt	gaa	cag	ata	gat	ggc	att	att	att	tcg	tca	192
His	Ser	Gly	Leu	Met	Phe	Glu	Gln	Ile	Asp	Gly	Ile	Ile	Ile	Ser	Ser	
	50					55					60					
gta	gtg	ccg	cca	atc	atg	ttt	gcg	tta	gaa	aga	atg	tgc	aca	aaa	tac	240
Val	Val	Pro	Pro	Ile	Met	Phe	Ala	Leu	Glu	Arg	Met	Cys	Thr	Lys	Tyr	
	65				70				75						80	
ttt	cat	atc	gag	cct	caa	att	gtt	ggc	cca	ggc	atg	aaa	acc	ggc	tta	288
Phe	His	Ile	Glu	Pro	Gln	Ile	Val	Gly	Pro	Gly	Met	Lys	Thr	Gly	Leu	
				85				90						95		
aat	ata	aaa	tat	gac	aat	ccg	aaa	gaa	gta	ggg	gca	gac	aga	atc	gta	336
Asn	Ile	Lys	Tyr	Asp	Asn	Pro	Lys	Glu	Val	Gly	Ala	Asp	Arg	Ile	Val	
			100					105					110			
aat	gct	gtc	gct	gcg	ata	cac	ttg	tac	ggc	aat	cca	tta	att	gtt	gtc	384
Asn	Ala	Val	Ala	Ala	Ile	His	Leu	Tyr	Gly	Asn	Pro	Leu	Ile	Val	Val	
		115					120					125				
gat	ttc	gga	acc	gcc	aca	acg	tac	tgc	tat	att	gat	gaa	aac	aaa	caa	432
Asp	Phe	Gly	Thr	Ala	Thr	Thr	Tyr	Cys	Tyr	Ile	Asp	Glu	Asn	Lys	Gln	
	130					135					140					
tac	atg	ggc	ggg	gcg	att	gcc	cct	ggg	att	aca	att	tcg	aca	gag	gcg	480
Tyr	Met	Gly	Gly	Ala	Ile	Ala	Pro	Gly	Ile	Thr	Ile	Ser	Thr	Glu	Ala	
	145				150				155						160	
ctt	tac	tcg	cgt	gca	gca	aag	ctt	cct	cgt	atc	gaa	atc	acc	cgg	ccc	528
Leu	Tyr	Ser	Arg	Ala	Ala	Lys	Leu	Pro	Arg	Ile	Glu	Ile	Thr	Arg	Pro	
				165				170						175		
gac	aat	att	atc	gga	aaa	aac	act	gtt	agc	gcg	atg	caa	tct	gga	att	576
Asp	Asn	Ile	Ile	Gly	Lys	Asn	Thr	Val	Ser	Ala	Met	Gln	Ser	Gly	Ile	
			180					185					190			
tta	ttt	ggc	tat	gtc	ggc	caa	gtg	gaa	gga	atc	gtt	aag	cga	atg	aaa	624
Leu	Phe	Gly	Tyr	Val	Gly	Gln	Val	Glu	Gly	Ile	Val	Lys	Arg	Met	Lys	
		195				200						205				
tgg	cag	gca	aaa	cag	gac	cca	agg	tca	ttg	cga	cag	gag	gcc	tgg	cgc	672
Trp	Gln	Ala	Lys	Gln	Asp	Pro	Arg	Ser	Leu	Arg	Gln	Glu	Ala	Trp	Arg	
	210					215					220					
cgc	tca	ttg	cga	acg	aat	cag	att	gta	tag							702
Arg	Ser	Leu	Arg	Thr	Asn	Gln	Ile	Val								
	225				230											

<210> 17  
 <211> 233  
 <212> PRT  
 <213> Bacillus subtilis

<400> 17

Met Leu Leu Val Ile Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val  
1 5 10 15

Tyr His Asp Gly Lys Leu Glu Tyr His Trp Arg Ile Glu Thr Ser Arg  
20 25 30

His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp  
35 40 45

His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser  
50 55 60

Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr  
65 70 75 80

Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu  
85 90 95

Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val  
100 105 110

Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val  
115 120 125

Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln  
130 135 140

Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala  
145 150 155 160

Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro  
165 170 175

Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile  
180 185 190

Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys  
195 200 205

Trp Gln Ala Lys Gln Asp Pro Arg Ser Leu Arg Gln Glu Ala Trp Arg  
210 215 220

Arg Ser Leu Arg Thr Asn Gln Ile Val  
225 230

<210> 18

<211> 163

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:promoter  
sequence

<220>

<221> -35\_signal  
<222> (113)..(118)

<220>

<221> -10\_signal  
<222> (136)..(141)

<400> 18  
gcctacctag cttccaagaa agatataccta acagcacaag agcggaaaga tgttttgttc 60  
tacatccaga acaacctctg ctaaaattcc tgaaaaattt tgcaaaaagt tgttgacttt 120  
atctacaagg tgtggtataa taatcttaac aacagcagga cgc 163

<210> 19  
<211> 194  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:promoter  
sequence

<220>  
<221> -35\_signal  
<222> (136)..(141)

<220>  
<221> -10\_signal  
<222> (159)..(164)

<400> 19  
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tatttctccc ttgaggggta caaagagggtg tccctagaag agatccacgc tgtgtaaaaa 120  
ttttacaaaa aggtattgac tttccctaca ggggtgtgtaa taatttaatt acaggcgggg 180  
gcaacccccgc ctgt 194

<210> 20  
<211> 248  
<212> PRT  
<213> Pseudomonas aeruginosa

<400> 20  
Met Ile Leu Glu Leu Asp Cys Gly Asn Ser Leu Ile Lys Trp Arg Val  
1 5 10 15  
Ile Glu Gly Ala Ala Arg Ser Val Ala Gly Gly Leu Ala Glu Ser Asp  
20 25 30  
Asp Ala Leu Val Glu Gln Leu Thr Ser Gln Gln Ala Leu Pro Val Arg  
35 40 45  
Ala Cys Arg Leu Val Ser Val Arg Ser Glu Gln Glu Thr Ser Gln Leu  
50 55 60  
Val Ala Arg Leu Glu Gln Leu Phe Pro Val Ser Ala Leu Val Ala Ser

65		70		75		80
Ser Gly Lys Gln Leu Ala Gly Val Arg Asn Gly Tyr Leu Asp Tyr Gln						
	85			90		95
Arg Leu Gly Leu Asp Arg Trp Leu Ala Leu Val Ala Ala His His Leu						
	100			105		110
Ala Lys Lys Ala Cys Leu Val Ile Asp Leu Gly Thr Ala Val Thr Ser						
	115			120		125
Asp Leu Val Ala Ala Asp Gly Val His Leu Gly Gly Tyr Ile Cys Pro						
	130			135		140
Gly Met Thr Leu Met Arg Ser Gln Leu Arg Thr His Thr Arg Arg Ile						
	145			150		155
Arg Tyr Asp Asp Ala Glu Ala Arg Arg Ala Leu Ala Ser Leu Gln Pro						
	165			170		175
Gly Gln Ala Thr Ala Glu Ala Val Glu Arg Gly Cys Leu Leu Met Leu						
	180			185		190
Arg Gly Phe Val Arg Glu Gln Tyr Ala Met Ala Cys Glu Leu Leu Gly						
	195			200		205
Pro Asp Cys Glu Ile Phe Leu Thr Gly Gly Asp Ala Glu Leu Val Arg						
	210			215		220
Asp Glu Leu Ala Gly Ala Arg Ile Met Pro Asp Leu Val Phe Val Gly						
	225			230		235
Leu Ala Leu Ala Cys Pro Ile Glu						
	245					

<210> 21  
 <211> 209  
 <212> PRT  
 <213> Campylobacter jejuni

<400> 21  
 Met Leu Leu Cys Asp Ile Gly Asn Ser Asn Ala Asn Phe Leu Asp Asp  
 1 5 10 15  
 Asn Lys Tyr Phe Thr Leu Asn Ile Asp Gln Phe Leu Glu Phe Lys Asn  
 20 25 30  
 Glu Gln Lys Ile Phe Tyr Ile Asn Val Asn Glu His Leu Lys Glu His  
 35 40 45  
 Leu Lys Asn Gln Lys Asn Phe Ile Asn Leu Glu Pro Tyr Phe Leu Phe  
 50 55 60  
 Asp Thr Ile Tyr Gln Gly Leu Gly Ile Asp Arg Ile Ala Ala Cys Tyr  
 65 70 75 80

Thr Ile Glu Asp Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile  
 85 90 95  
 Asp Ile Ile Ser Asn Ser Ile His Leu Gly Gly Phe Ile Leu Pro Gly  
 100 105 110  
 Ile Ala Asn Tyr Lys Lys Ile Tyr Ser His Ile Ser Pro Arg Leu Lys  
 115 120 125  
 Ser Glu Phe Asn Thr Gln Val Ser Leu Asp Ala Phe Pro Gln Lys Thr  
 130 135 140  
 Met Asp Ala Leu Ser Tyr Gly Val Phe Lys Gly Ile Tyr Leu Leu Ile  
 145 150 155 160  
 Lys Asp Ala Ala Gln Asn Lys Lys Leu Tyr Phe Thr Gly Gly Asp Gly  
 165 170 175  
 Gln Phe Leu Ala Asn Tyr Phe Asp His Ala Ile Tyr Asp Lys Leu Leu  
 180 185 190  
 Ile Phe Arg Gly Met Lys Lys Ile Ile Lys Glu Asn Pro Asn Leu Leu  
 195 200 205

Tyr

<210> 22  
 <211> 592  
 <212> PRT  
 <213> Neisseria meningitidis

<400> 22

Met Thr Val Leu Lys Pro Ser His Trp Arg Val Leu Ala Glu Leu Ala  
 1 5 10 15  
 Asp Gly Leu Pro Gln His Val Ser Gln Leu Ala Arg Met Ala Asp Met  
 20 25 30  
 Lys Pro Gln Gln Leu Asn Gly Phe Trp Gln Gln Met Pro Ala His Ile  
 35 40 45  
 Arg Gly Leu Leu Arg Gln His Asp Gly Tyr Trp Arg Leu Val Arg Pro  
 50 55 60  
 Leu Ala Val Phe Asp Ala Glu Gly Leu Arg Glu Leu Gly Glu Arg Ser  
 65 70 75 80  
 Gly Phe Gln Thr Ala Leu Lys His Glu Cys Ala Ser Ser Asn Asp Glu  
 85 90 95  
 Ile Leu Glu Leu Ala Arg Ile Ala Pro Asp Lys Ala His Lys Thr Ile  
 100 105 110  
 Cys Val Thr His Leu Gln Ser Lys Gly Arg Gly Arg Gln Gly Arg Lys  
 115 120 125

Trp Ser His Arg Leu Gly Glu Cys Leu Met Phe Ser Phe Gly Trp Val  
 130 135 140  
 Phe Asp Arg Pro Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala  
 145 150 155 160  
 Val Ala Cys Arg Arg Ala Leu Ser Arg Leu Gly Leu Lys Thr Gln Ile  
 165 170 175  
 Lys Trp Pro Asn Asp Leu Val Val Gly Arg Asp Lys Leu Gly Gly Ile  
 180 185 190  
 Leu Ile Glu Thr Val Arg Thr Gly Gly Lys Thr Val Ala Val Val Gly  
 195 200 205  
 Ile Gly Ile Asn Phe Val Leu Pro Lys Glu Val Glu Asn Ala Ala Ser  
 210 215 220  
 Val Gln Ser Leu Phe Gln Thr Ala Ser Arg Arg Gly Asn Ala Asp Ala  
 225 230 235 240  
 Ala Val Leu Leu Glu Thr Leu Leu Ala Glu Leu Asp Ala Val Leu Leu  
 245 250 255  
 Gln Tyr Ala Arg Asp Gly Phe Ala Pro Phe Val Ala Glu Tyr Gln Ala  
 260 265 270  
 Ala Asn Arg Asp His Gly Lys Ala Val Leu Leu Leu Arg Asp Gly Glu  
 275 280 285  
 Thr Val Phe Glu Gly Thr Val Lys Gly Val Asp Gly Gln Gly Val Leu  
 290 295 300  
 His Leu Glu Thr Ala Glu Gly Lys Gln Thr Val Val Ser Gly Glu Ile  
 305 310 315 320  
 Ser Leu Arg Ser Asp Asp Arg Pro Val Ser Val Pro Lys Arg Arg Asp  
 325 330 335  
 Ser Glu Arg Phe Leu Leu Leu Asp Gly Gly Asn Ser Arg Leu Lys Trp  
 340 345 350  
 Ala Trp Val Glu Asn Gly Thr Phe Ala Thr Val Gly Ser Ala Pro Tyr  
 355 360 365  
 Arg Asp Leu Ser Pro Leu Gly Ala Glu Trp Ala Glu Lys Val Asp Gly  
 370 375 380  
 Asn Val Arg Ile Val Gly Cys Ala Val Cys Gly Glu Phe Lys Lys Ala  
 385 390 395 400  
 Gln Val Gln Glu Gln Leu Ala Arg Lys Ile Glu Trp Leu Pro Ser Ser  
 405 410 415  
 Ala Gln Ala Leu Gly Ile Arg Asn His Tyr Arg His Pro Glu Glu His  
 420 425 430

Gly Ser Asp Arg Trp Phe Asn Ala Leu Gly Ser Arg Arg Phe Ser Arg  
 435 440 445  
 Asn Ala Cys Val Val Val Ser Cys Gly Thr Ala Val Thr Val Asp Ala  
 450 455 460  
 Leu Thr Asp Asp Gly His Tyr Leu Gly Gly Thr Ile Met Pro Gly Phe  
 465 470 475 480  
 His Leu Met Lys Glu Ser Leu Ala Val Arg Thr Ala Asn Leu Asn Arg  
 485 490 495  
 His Ala Gly Lys Arg Tyr Pro Phe Pro Thr Thr Thr Gly Asn Ala Val  
 500 505 510  
 Ala Ser Gly Met Met Asp Ala Val Cys Gly Ser Val Met Met Met His  
 515 520 525  
 Gly Arg Leu Lys Glu Lys Thr Gly Ala Gly Lys Pro Val Asp Val Ile  
 530 535 540  
 Ile Thr Gly Gly Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala  
 545 550 555 560  
 Phe Leu Ala Glu Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile His  
 565 570 575  
 Gly Leu Leu Asn Leu Ile Ala Ala Glu Gly Gly Glu Ser Glu His Thr  
 580 585 590

<210> 23  
 <211> 753  
 <212> DNA  
 <213> Clostridium acetobutylicum

<400> 23  
 aataagagag cagcttttat gctgctctta tttttaagga gtgtattaaa agtgatttta 60  
 gtttttagatg ttggcaatac taatatagtg ttaggaatat acaatgatac gaaacttaca 120  
 gctgaatgga gactatcaac agatgtatta agatctgctg acgaatatgg aattcaagta 180  
 atgaacttat ttcaacaaga taagctcgat ccaacattag ttgagggagt aataatatcc 240  
 tctgttgtag ctaatatcat gtattcttta gaacatatga taagaaagta ctttaagata 300  
 aatccattag ttgttgacc tggaataaaa acaggaatta atattaaata cgataatcct 360  
 aaagaagttg gagccgacag aattgtaa atgctgtagcag cacatgaaat ttataaaaga 420  
 tctcttataa taatagattt tggaacagca actacatttt gtgcagtaag agaaaatgga 480  
 gattatcttg gtggagcaat atgccctgga attaaagttt catcagaggc tctttttgaa 540  
 aaggcagcta agcttccaag agtagagctc ataaaaccag cgtatgctat ttgtaaaaat 600  
 actatttcaa gtatacaatc tggaattggt tatcgatacc tacgtcaggt aaaataactta 660  
 tttgaaaaat tgaaagaaaa cctgccggac ggaaggagaa caaggacctc cttggtattg 720  
 gccacaggtg gtcttgccaa acttattaat tga 753

<210> 24  
 <211> 798  
 <212> DNA

<213> *Streptomyces coelicolor*

<400> 24

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atgctgctga cgatcgacgt agggaaacacg cacaccgtcc tcggcctctt cgacggcgag 60
gacatcgtcg agcactggcg catctccacg gactcgcgcc gcacggccga cgaactggcg 120
gtgctcctcc agggcctcat gggcatgcat cccctcctcg gcgacgaact gggcgacggc 180
atcgacggca tcgccatctg cgcgacggtc ccctccgtcc tccacgaact gcgcgaggtc 240
acccgccgct actacggcga cgtccccgcg gtcctcgtcg aaccgggct caagaccggc 300
gtcccgatcc tcaccgacca cccaaggag gtcggcgccg accgcatcat caacgcggta 360
gcggccgtgg agctctacgg cggcccggcg atcgtcgtgg acttcggcac ggcgacgacg 420
ttcgacgcgg tcagcgcgcg cggggagtac atcggcgggc tcatcgcccc cggcatcgag 480
atctcggtcg aggcgctggg cgtcaagggc gccagctcc gcaagatcga ggtggcgcg 540
ccccgcagcg tgateggcaa gaacacggtc gaggcgatgc agtccggcat cgtgtacggc 600
ttcgccggcc aggtcgacgg cgtcgtcaac cgcattggcg gggagctggc cgacgacccg 660
gacgacgtga cggatcatcg gacggggcgg ctggcgccga tggctctggg cgagtcctcg 720
gtcatcgacg agcacgagcc gtggctgacg ctgatgggtc tgcgcctggt gtacgagcgc 780
aacgtgtcgc gcatgtag                                     798
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<210> 25

<211> 819

<212> DNA

<213> *Mycobacterium tuberculosis*

<400> 25

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gtgctgctgg cgattgacgt ccgcaacacc cacaccgttg tgggcctgct gtccggaatg 60
aaagagcacg caaaggctcg gcagcagtgg cggatacgca ccgaatccga agtcaccgcc 120
gacgaactgg cactgacgat cgacgggctg atcggcgagg attccgagcg gctcaccggg 180
accgccgcct tgtccacggg cccgtccgtg ctgcacgagg tgcggataat gctcgaccag 240
tactggccgt cgggtgccga cgtgctgac gagcccggag tacgcaccgg gatccctttg 300
ctcgtcgaca acccgaagga agtgggcgca gaccgcatcg tgaactgttt ggccgcctat 360
gaccggttcc ggaaggccgc catcgctcgt gactttggat cctcgatctg tgttgatggt 420
gtatcggcc aagggtgaatt tcttgccggc gccatcgcg ccgggggtgca ggtgtcttcc 480
gatgccgcgg cggcccgcct ggccggcatt cgccgcgttg aacttgccc cccacgttcg 540
gtgggttgga agaacaccgt cgaatgcat caagccgggt cgggtgttcg cttcgccggg 600
ctggtagacg ggttggtagg ccgcatccgc gaggacgtgt ccggtttctc cgtcgaccac 660
gatgtcgca tcgtggctac cgggcatacc gcgccctgc tgcgcccga attgcacacc 720
gtcgaccatt acgaccagca cctgaccttg cagggtctgc ggctgggtgt cgagcgtaac 780
ctcgaagtcc agcgcggccg gctcaagacg gcgcgctga                                     819
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<210> 26

<211> 777

<212> DNA

<213> *Rhodobacter capsulatus*

<400> 26

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atgcttttgt gcatcgactg cggcaacacc aacaccgtgt ttctggctct ggacgggacg 60
gatttcgccg ccacctggcg catcgccacc gatcatcgcc gcaccgccga cgaatatatt 120
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atctcctcga ccgcgcgcg ggtggtgttc aacctgcgcg ttctgtgcaa ccgctatttc 240
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<210> 27

<211> 768

<212> DNA

<213> *Geobacter sulfurreducens*

<400> 27

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<210> 28

<211> 789

<212> DNA

<213> *Deinococcus radiodurans*

<400> 28

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<210> 29

<211> 741

<212> DNA

<213> *Thermotoga maritima*

<400> 29

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<210> 30

<211> 822

<212> DNA

<213> *Treponema pallidum*

<400> 30

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<210> 31

<211> 789

<212> DNA

<213> *Borrelia burgdorferi*

<400> 31

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gttaattga						789

<210> 32

<211> 690  
 <212> DNA  
 <213> Aquifex aeolicus

<400> 32  
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 aagaatgttg tagtaatcag tgcgggtact gcccttgtaa ttgacctagt tcttgagggc 360  
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<210> 33  
 <211> 774  
 <212> DNA  
 <213> Synechocystis sp.

<400> 33  
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 caggattggc aaaagctttt tcctggtgcc gccatggtta tcaccggggg agacggcaag 660  
 atattacatg gcttcctaaa agagcattct cctaattctt cggtggcctg ggatgacaat 720  
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<210> 34  
 <211> 672  
 <212> DNA  
 <213> Helicobacter pylori

<400> 34  
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&lt;210&gt; 35

&lt;211&gt; 747

&lt;212&gt; DNA

<213> *Pseudomonas aeruginosa*

&lt;400&gt; 35

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&lt;210&gt; 36

&lt;211&gt; 630

&lt;212&gt; DNA

<213> *Campylobacter jejuni*

&lt;400&gt; 36

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ataaaagaaa atcccaattt actttattaa 630

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&lt;210&gt; 37

&lt;211&gt; 1779

&lt;212&gt; DNA

<213> *Neisseria meningitidis*

&lt;400&gt; 37

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<210> 38

<211> 804

<212> DNA

<213> Bordetella pertussis

<400> 38

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<210> 39

<211> 460

<212> PRT

<213> Neisseria gonorrhoeae

<400> 39

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 Val Arg Ala Gly Gly Lys Thr Val Ala Val Val Gly Ile Gly Ile Asn  
 65 70 75 80  
 Phe Val Leu Pro Lys Glu Val Glu Asn Ala Ala Ser Val Gln Ser Leu  
 85 90 95  
 Phe Gln Thr Ala Ser Arg Arg Gly Asn Ala Asp Ala Ala Val Leu Leu  
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 Glu Thr Leu Leu Ala Glu Leu Gly Ala Val Leu Glu Gln Tyr Ala Glu  
 115 120 125  
 Glu Gly Phe Ala Pro Phe Leu Asn Glu Tyr Glu Thr Ala Asn Arg Asp  
 130 135 140  
 His Gly Lys Ala Val Leu Leu Leu Arg Asp Gly Glu Thr Val Cys Glu  
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 Asp Asn Arg Ser Val Ser Val Pro Lys Arg Pro Asp Ser Glu Arg Phe  
 195 200 205  
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 210 215 220  
 Asn Gly Thr Phe Ala Thr Val Gly Ser Ala Pro Tyr Arg Asp Leu Ser  
 225 230 235 240  
 Pro Leu Gly Ala Glu Trp Ala Glu Lys Ala Asp Gly Asn Val Arg Ile  
 245 250 255  
 Val Gly Cys Ala Val Cys Gly Glu Ser Lys Lys Ala Gln Val Lys Glu  
 260 265 270  
 Gln Leu Ala Arg Lys Ile Glu Trp Leu Pro Ser Ser Ala Gln Ala Leu  
 275 280 285  
 Gly Ile Arg Asn His Tyr Arg His Pro Glu Glu His Gly Ser Asp Arg  
 290 295 300  
 Trp Phe Asn Ala Leu Gly Ser Arg Arg Phe Ser Arg Asn Ala Cys Val  
 305 310 315 320  
 Val Val Ser Cys Gly Thr Ala Val Thr Val Asp Ala Leu Thr Asp Asp  
 325 330 335



Gly His Tyr Leu Gly Gly Thr Ile Met Pro Gly Phe His Leu Met Lys  
 340 345 350  
 Glu Ser Leu Ala Val Arg Thr Ala Asn Leu Asn Arg Pro Ala Gly Lys  
 355 360 365  
 Arg Tyr Pro Phe Pro Thr Thr Thr Gly Asn Ala Val Ala Ser Gly Met  
 370 375 380  
 Met Asp Ala Val Cys Gly Ser Ile Met Met Met His Gly Arg Leu Lys  
 385 390 395 400  
 Glu Lys Asn Gly Ala Gly Lys Pro Val Asp Val Ile Ile Thr Gly Gly  
 405 410 415  
 Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala Phe Leu Ala Glu  
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<210> 40  
 <211> 1383  
 <212> DNA  
 <213> Neisseria gonorrhoeae

<400> 40  
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 gaaacgcaaa tcaagtggcc aaacgatttg gtcgtcggac gcgacaaatt gggcggcatt 180  
 ctgattgaaa cagtcagggc gggcggtaaa acggttgccg tggtcggtat cggcatcaat 240  
 ttcgtgctgc ccaaggaagt ggaaaacgcc gcttccgtgc agtcgctgtt tcagacggca 300  
 tcgcggcggg gcaatgccga tgccgccgta ttgctggaaa cattgcttgc ggaactgggc 360  
 gcggtgttgg aacaatatgc ggaagaaggg ttgcgcgcat ttttaaata gaatgaaacg 420  
 gccaaccgcg accacggcaa ggcggtattg ctggtgcgcg acggcgaaac cgtgtgcgaa 480  
 ggcacgggta aaggcgtgga cggacgaggc gttctgcact tggaaacggc agaaggcgaa 540  
 cagacggctc tcagcggcga aatcagcctg cggcccgcga acaggtcggg ttccgtgccg 600  
 aagcggccgg attcggaaacg ttttttgcgt ttggaaggcg ggaacagccg gctcaagtgg 660  
 gcgtgggtgg aaaacggcac gttcgcaacc gtgggcagcg cgccgtaccg cgatttgtcg 720  
 cctttgggcg cggagtgggc ggaaaaggcg gatggaaatg tccgcacgtt cggttgcgcc 780  
 gtgtgcggag aatccaaaaa ggcacaagtg aaggaaacgc tcgcccga aaatcgagtgg 840  
 ctgccgtctt ccgcacaggc tttgggcata cgcaaccact accgccaccc cgaagaacac 900  
 gggtccgacc gttggttcaa cgccttgggc agccgcgctc tcagccgcaa cgcctgcgtc 960  
 gtcgtcagtt gcggcacggc ggtaacggtt gacgcgtca ccgatgacgg acattatctc 1020  
 ggcggaacca tcatgcccgg cttccacctg atgaaagaat cgctcgccgt ccgaaccgcc 1080  
 aacctcaacc gccccgccg caaacgttac cttttcccga ccacaacggg caacgccgtc 1140  
 gcaagcggca tgatggacgc ggtttgcggc tcgataatga tgatgcacgg ccgtttgaaa 1200  
 gaaaaaaacg gcgcgggcaa gcctgtcgat gtcattcatta ccggcgggcg cgcggcgaaa 1260  
 gtcgccgaag ccctgccgcc tgcatttttg gcggaataa ccgtgcgcgt ggcggacaac 1320  
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<210> 41  
 <211> 244  
 <212> PRT  
 <213> Porphyromonas gingivalis

<400> 41

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			20					25					30		
Lys	Ala	Gly	Gln	Ala	Leu	Ser	His	Leu	Val	Ala	Pro	His	Arg	Phe	Asp
		35					40					45			
Lys	Ala	Ile	Tyr	Ser	Ser	Val	Gly	Leu	Pro	Asp	Glu	Glu	Ala	Glu	Ala
	50					55					60				
Ile	Val	Arg	Ser	Cys	Ala	Ala	Ala	Ser	Leu	Met	Met	Gly	Thr	Glu	Thr
65					70					75					80
Pro	Val	Pro	Leu	Arg	Leu	Gln	Tyr	Asp	Arg	Arg	Thr	Leu	Gly	Ala	Asp
				85					90					95	
Arg	Leu	Ala	Ala	Val	Val	Gly	Ala	His	Ser	Leu	Tyr	Pro	Asn	Thr	Glu
			100					105					110		
Leu	Leu	Val	Ile	Asp	Ala	Gly	Thr	Ala	Ile	Thr	Tyr	Glu	Arg	Val	Ser
		115					120					125			
Ala	Glu	Gly	Ile	Tyr	Leu	Gly	Gly	Asn	Ile	Ser	Pro	Gly	Leu	His	Leu
	130					135					140				
Arg	Phe	Lys	Ala	Leu	His	Leu	Phe	Thr	Gly	Arg	Leu	Pro	Leu	Ile	Asp
145					150					155					160
Pro	Ser	Gly	Ile	Ser	Pro	Lys	Ile	Ala	Glu	Tyr	Gly	Ser	Ser	Thr	Glu
				165					170					175	
Glu	Ala	Ile	Thr	Ala	Gly	Val	Ile	His	Gly	Leu	Ala	Gly	Glu	Ile	Asp
			180					185					190		
Arg	Tyr	Ile	Asp	Asp	Leu	His	Ala	Lys	Glu	Gly	Arg	Ser	Ala	Val	Ile
		195					200					205			
Leu	Thr	Gly	Gly	Asp	Ala	Asn	Tyr	Leu	Ala	Arg	Ile	Ile	Arg	Ser	Gly
	210					215					220				
Ile	Leu	Ile	His	Pro	Asp	Leu	Val	Leu	Leu	Gly	Leu	Asn	Arg	Ile	Leu
225					230					235					240
Glu	Tyr	Asn	Val												

<210> 42



<211> 735  
 <212> DNA  
 <213> Porphyromonas gingivalis

<400> 42

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ccttccggta tctctccgaa aatagccgag tatggctcct cgaccgaaga agcgatcaca 540
gccggagtaa ttcattggcct ggcaggggag atagacagat atattgacga tctgcacgct 600
aaagaggggc ggtctgccgt tatactgacc ggaggagatg ccaactatth ggcacggatt 660
ataagaagcg gaataactaat tcatcccgat ttagtacttt tgggcctaaa tagaatttta 720
gaatataatg tataa                                     735
  
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<210> 43  
 <211> 592  
 <212> PRT  
 <213> Neisseria meningitidis

<400> 43

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Met Thr Val Leu Lys Leu Ser His Trp Arg Val Leu Ala Glu Leu Ala
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      20              25              30
Lys Pro Gln Gln Leu Asn Gly Phe Trp Gln Gln Met Pro Ala His Ile
      35              40              45
Arg Gly Leu Leu Arg Gln His Asp Gly Tyr Trp Arg Leu Val Arg Pro
      50              55              60
Leu Ala Val Phe Asp Ala Glu Gly Leu Arg Glu Leu Gly Glu Arg Ser
      65              70              75              80
Gly Phe Gln Thr Ala Leu Lys His Glu Cys Ala Ser Ser Asn Asp Glu
      85              90              95
Ile Leu Glu Leu Ala Arg Ile Ala Pro Asp Lys Ala His Lys Thr Ile
      100             105             110
Cys Val Thr His Leu Gln Ser Lys Gly Arg Gly Arg Gln Gly Arg Lys
      115             120             125
Trp Ser His Arg Leu Gly Glu Cys Leu Met Phe Ser Phe Gly Trp Val
      130             135             140
Phe Asp Arg Pro Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala
      145             150             155             160
  
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Val	Ala	Cys	Arg	Arg	Ala	Leu	Ser	Arg	Leu	Gly	Leu	Asp	Val	Gln	Ile	165	170	175	
Lys	Trp	Pro	Asn	Asp	Leu	Val	Val	Gly	Arg	Asp	Lys	Leu	Gly	Gly	Ile	180	185	190	
Leu	Ile	Glu	Thr	Val	Arg	Thr	Gly	Gly	Lys	Thr	Val	Ala	Val	Val	Gly	195	200	205	
Ile	Gly	Ile	Asn	Phe	Val	Leu	Pro	Lys	Glu	Val	Glu	Asn	Ala	Ala	Ser	210	215	220	
Val	Gln	Ser	Leu	Phe	Gln	Thr	Ala	Ser	Arg	Arg	Gly	Asn	Ala	Asp	Ala	225	230	235	240
Ala	Val	Leu	Leu	Glu	Thr	Leu	Leu	Val	Glu	Leu	Asp	Ala	Val	Leu	Leu	245	250	255	
Gln	Tyr	Ala	Arg	Asp	Gly	Phe	Ala	Pro	Phe	Val	Ala	Glu	Tyr	Gln	Ala	260	265	270	
Ala	Asn	Arg	Asp	His	Gly	Lys	Ala	Val	Leu	Leu	Leu	Arg	Asp	Gly	Glu	275	280	285	
Thr	Val	Phe	Glu	Gly	Thr	Val	Lys	Gly	Val	Asp	Gly	Gln	Gly	Val	Leu	290	295	300	
His	Leu	Glu	Thr	Ala	Glu	Gly	Lys	Gln	Thr	Val	Val	Ser	Gly	Glu	Ile	305	310	315	320
Ser	Leu	Arg	Ser	Asp	Asp	Arg	Pro	Val	Ser	Val	Pro	Lys	Arg	Arg	Asp	325	330	335	
Ser	Glu	Arg	Phe	Leu	Leu	Leu	Asp	Gly	Gly	Asn	Ser	Arg	Leu	Lys	Trp	340	345	350	
Ala	Trp	Val	Glu	Asn	Gly	Thr	Phe	Ala	Thr	Val	Gly	Ser	Ala	Pro	Tyr	355	360	365	
Arg	Asp	Leu	Ser	Pro	Leu	Gly	Ala	Glu	Trp	Ala	Glu	Lys	Ala	Asp	Gly	370	375	380	
Asn	Val	Arg	Ile	Val	Gly	Cys	Ala	Val	Cys	Gly	Glu	Phe	Lys	Lys	Ala	385	390	395	400
Gln	Val	Gln	Glu	Gln	Leu	Ala	Arg	Lys	Ile	Glu	Trp	Leu	Pro	Ser	Ser	405	410	415	
Ala	Gln	Ala	Leu	Gly	Ile	Arg	Asn	His	Tyr	Arg	His	Pro	Glu	Glu	His	420	425	430	
Gly	Ser	Asp	Arg	Trp	Phe	Asn	Ala	Leu	Gly	Ser	Arg	Arg	Phe	Ser	Arg	435	440	445	
Asn	Ala	Cys	Val	Val	Val	Ser	Cys	Gly	Thr	Ala	Val	Thr	Val	Asp	Ala	450	455	460	

Leu Thr Asp Asp Gly His Tyr Leu Gly Gly Thr Ile Met Pro Gly Phe  
 465 470 475 480  
 His Leu Met Lys Glu Ser Leu Ala Val Arg Thr Ala Asn Leu Asn Arg  
 485 490 495  
 His Ala Gly Lys Arg Tyr Pro Phe Pro Thr Thr Thr Gly Asn Ala Val  
 500 505 510  
 Ala Ser Gly Met Met Asp Ala Val Cys Gly Ser Val Met Met Met His  
 515 520 525  
 Gly Arg Leu Lys Glu Lys Thr Gly Ala Gly Lys Pro Val Asp Val Ile  
 530 535 540  
 Ile Thr Gly Gly Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala  
 545 550 555 560  
 Phe Leu Ala Glu Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile Tyr  
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 Gly Leu Leu Asn Met Ile Ala Ala Glu Gly Arg Glu Tyr Glu His Ile  
 580 585 590

<210> 44  
 <211> 1779  
 <212> DNA  
 <213> *Neisseria meningitidis*

<400> 44  
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 tggcagcaga tgccggcgca catacgcggg ctggtgcgcc aacacgacgg ctattggcgg 180  
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 ggttttcaga cggcattgaa gcacgagtcg gcgtccagca acgacgagat actggaattg 300  
 gcgcggattg cgccggacaa ggcgcacaaa accatatgcg tgaccacact gcaaagtaag 360  
 ggcagggggc ggcagggggc gaagtggctc caccgtttgg gcgagtgtct gatgttcagt 420  
 tttggctggg tgtttgaccg gccgcagtat gagttgggtt cgctgtcgcc tgttgccgca 480  
 gtggcgtgtc ggcgcgcctt gtcgcgttta ggtttggatg tgcagattaa gtggcccaat 540  
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 ggcaaaacgg ttgccgtggg cggatatcggc atcaattttg tcctgcccaa ggaagtagaa 660  
 aatgccgctt ccgtgcaatc gctgtttcag acggcatcgc ggcggggcaa tgccgatgcc 720  
 gccgtgctgc tggaaacgct gttggtggaa ctggacgcgg tgttgttgca atatgcgcgg 780  
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 gtattgctgt tgcgcgacgg cgaaaccgtg ttcgaaggca cggttaaagg cgtggacgga 900  
 caaggcgttt tgcacttgga aacggcagag ggcaaacaga cggtcgtcag cggcgaaatc 960  
 agcctgcggt ccgacgacag gccggtttcc gtgccgaagc ggcgggattc ggaacgtttt 1020  
 ctgctgttgg acggcggcaa cagccggctc aagtgggcgt ggggtgaaaa cggcacgttc 1080  
 gcaaccgtcg gtagcgcgcc gtaccgcgat ttgtcgctt tgggcgcgga gtgggcggaa 1140  
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tgcggctcgg ttatgatgat gcacgggctg ttgaaagaaa aaaccggggc gggcaagcct 1620  
 gtcgatgtca tcattaccgg cggcggcgcg gcaaaagttg ccgaagccct gccgcctgca 1680  
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 atgattgccg ccgaaggcag ggaatatgaa catatttaa 1779

<210> 45  
 <211> 262  
 <212> PRT  
 <213> Bacillus anthracis

<400> 45

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Phe	Glu	Glu	Gly	Glu	Leu	Arg	Gln	His	Trp	Arg	Met	Glu	Thr	Asp	Arg	20	25	30	
His	Lys	Thr	Glu	Asp	Glu	Tyr	Gly	Met	Leu	Val	Lys	Gln	Leu	Leu	Glu	35	40	45	
His	Glu	Gly	Leu	Ser	Phe	Glu	Asp	Val	Lys	Gly	Ile	Ile	Val	Ser	Ser	50	55	60	
Val	Val	Pro	Pro	Ile	Met	Phe	Ala	Leu	Glu	Arg	Met	Cys	Glu	Lys	Tyr	65	70	75	80
Phe	Lys	Ile	Lys	Pro	Leu	Val	Val	Gly	Pro	Gly	Ile	Lys	Thr	Gly	Leu	85	90	95	
Asn	Ile	Lys	Tyr	Glu	Asn	Pro	Arg	Glu	Val	Gly	Ala	Asp	Arg	Ile	Val	100	105	110	
Asn	Ala	Val	Ala	Gly	Ile	His	Leu	Tyr	Gly	Ser	Pro	Leu	Ile	Ile	Val	115	120	125	
Asp	Phe	Gly	Thr	Ala	Thr	Thr	Tyr	Cys	Tyr	Ile	Asn	Glu	Glu	Lys	His	130	135	140	
Tyr	Met	Gly	Gly	Val	Ile	Thr	Pro	Gly	Ile	Met	Ile	Ser	Ala	Glu	Ala	145	150	155	160
Leu	Tyr	Ser	Arg	Ala	Ala	Lys	Leu	Pro	Arg	Ile	Glu	Ile	Thr	Lys	Pro	165	170	175	
Ser	Ser	Val	Val	Gly	Lys	Asn	Thr	Val	Ser	Ala	Met	Gln	Ser	Gly	Ile	180	185	190	
Leu	Tyr	Gly	Tyr	Val	Gly	Gln	Val	Glu	Gly	Ile	Val	Lys	Arg	Met	Lys	195	200	205	
Glu	Glu	Ala	Lys	Gln	Glu	Pro	Lys	Val	Ile	Ala	Thr	Gly	Gly	Leu	Ala	210	215	220	
Lys	Leu	Ile	Ser	Glu	Glu	Ser	Asn	Val	Ile	Asp	Val	Val	Asp	Pro	Phe	225	230	235	240

Leu Thr Leu Lys Gly Leu Tyr Met Leu Tyr Glu Arg Asn Ala Asn Leu  
245 250 255

Gln His Glu Lys Gly Glu  
260

<210> 46  
<211> 789  
<212> DNA  
<213> Bacillus anthracis

<400> 46  
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atgcttgtga agcagttgct tgagcatgag ggtctttcgt ttgaagatgt gaaaggtatt 180  
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tttaaaatta agccgcttgt agtaggtcct ggaataaaaa cgggggctaaa tattaaatat 300  
gaaaatccac gtgaagtagg tgcggatcga atcgtaaagt cagtagcagg gatccactta 360  
tatggaagtc cgcttattat tgtcgatttt ggtacggcta ctacatattg ttatattaac 420  
gaagaaaagc attatatggg tggagttatt acaccgggaa ttatgatttc agcagaggct 480  
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ggtgaataa 789

<210> 47  
<211> 254  
<212> PRT  
<213> Bacillus halodurans

<400> 47  
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Tyr Gln Asp Glu Thr Leu Val His His Trp Arg Leu Ala Thr Ser Arg  
20 25 30  
Gln Lys Thr Glu Asp Glu Tyr Ala Met Thr Val Arg Ser Leu Phe Asp  
35 40 45  
His Ala Gly Leu Gln Phe Gln Asp Ile Asp Gly Ile Val Ile Ser Ser  
50 55 60  
Val Val Pro Pro Met Met Phe Ser Leu Glu Gln Met Cys Lys Lys Tyr  
65 70 75 80  
Phe His Val Thr Pro Met Ile Ile Gly Pro Gly Ile Lys Thr Gly Leu  
85 90 95  
Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val  
100 105 110  
Asn Ala Val Ala Ala Ile Glu Leu Tyr Gly Tyr Pro Ala Ile Val Val

115	120	125
Asp Phe Gly Thr Ala Thr Thr Tyr Cys Leu Ile Asn Glu Lys Lys Gln 130 135 140		
Tyr Ala Gly Gly Val Ile Ala Pro Gly Ile Met Ile Ser Thr Glu Ala 145 150 155 160		
Leu Tyr His Arg Ala Ser Lys Leu Pro Arg Ile Glu Ile Ala Lys Pro 165 170 175		
Lys Gln Val Val Gly Thr Asn Thr Ile Asp Ser Met Gln Ser Gly Ile 180 185 190		
Phe Tyr Gly Tyr Val Ser Gln Val Asp Gly Val Val Lys Arg Met Lys 195 200 205		
Ala Gln Ala Glu Ser Glu Pro Lys Val Ile Ala Thr Gly Gly Leu Ala 210 215 220		
Lys Leu Ile Gly Thr Glu Ser Glu Thr Ile Asp Val Ile Asp Ser Phe 225 230 235 240		
Leu Thr Leu Lys Gly Leu Gln Leu Ile Tyr Lys Lys Asn Val 245 250		

<210> 48  
 <211> 765  
 <212> DNA  
 <213> Bacillus halodurans

<400> 48  
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 atgacggtgc gttctctctt tgatcatgca ggtctacagt ttcaagacat agacggcatt 180  
 gtcatttcat ctgttgtccc accgatgatg ttttccttag agcaaagtgt caaaaaatac 240  
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 gacaatccaa aagaggttgg ggccgatcga atcgttaatg cagttgcagc gattgagtta 360  
 tatggctacc ctgccattgt cgttgatttt ggaacagcaa caacatattg ctttaattaat 420  
 gaaaaaaaaac aatatgcagg gggagtcatt gtccttgaa tcatgatctc aacagaagcg 480  
 ttgtatcatc gcgcatcaaa attgccacgg attgaaatag cgaagccgaa acaagtcgta 540  
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 gatgggtgttg tgaaacgaat gaaggctcaa gcagaaagtg aaccgaaagt cattgcaact 660  
 ggtgggcttg cgaagttaat cggaaccgag tcggaacca ttgatgtaat cgattcgttt 720  
 ttaacattaa aaggattgca actcatttat aagaagaatg tctga 765

<210> 49  
 <211> 258  
 <212> PRT  
 <213> Bacillus stearothermophilus

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 Ser Lys Thr Glu Asp Glu Tyr Gly Met Met Ile Lys Ala Leu Leu Asn  
                   35                                  40                                  45  
 His Val Gly Leu Gln Phe Ser Asp Ile Arg Gly Ile Ile Ile Ser Ser  
                   50                                  55                                  60  
 Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Leu Lys Tyr  
                   65                                  70                                  75                                  80  
 Phe His Ile Lys Pro Leu Ile Val Gly Pro Gly Ile Lys Thr Gly Leu  
                   85                                  90                                  95  
 Asp Ile Lys Tyr Asp Asn Pro Arg Glu Val Gly Ala Asp Arg Ile Val  
                   100                                  105                                  110  
 Asn Ala Val Ala Gly Ile His Leu Tyr Gly Ser Pro Leu Ile Ile Val  
                   115                                  120                                  125  
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asn Glu His Lys Gln  
                   130                                  135                                  140  
 Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Met Ile Ser Thr Glu Ala  
                   145                                  150                                  155                                  160  
 Leu Phe Ala Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Ala Arg Pro  
                   165                                  170                                  175  
 Asp Asp Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ala Gly Ile  
                   180                                  185                                  190  
 Leu Tyr Gly Tyr Val Gly Gln Val Glu Gly Ile Val Ser Arg Met Lys  
                   195                                  200                                  205  
 Ala Lys Ser Lys Ile Pro Pro Lys Val Ile Ala Thr Gly Gly Leu Ala  
                   210                                  215                                  220  
 Pro Leu Ile Ala Ser Glu Ser Asp Ile Ile Asp Val Val Asp Pro Phe  
                   225                                  230                                  235                                  240  
 Leu Thr Leu Thr Gly Leu Lys Leu Leu Tyr Glu Lys Asn Thr Glu Lys  
                   245                                  250                                  255  
 Lys Gly

<210> 50  
 <211> 777  
 <212> DNA  
 <213> *Bacillus stearothermophilus*

<400> 50  
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ttccatatca aaccgctcat cgctcgggccg ggcattaaaa ccgggctcga catcaaatat 300
gacaatccgc gtgaggtggg cgccgaccgg attgtcaacg cggttgccg catccatttg 360
tacggcagtc cgctgattat cgctcatttt ggcacggcga cgacgtattg ttatattaat 420
gaacataaac aatatatggg aggggccatt gcccgggaa ttatgatctc gacagaggct 480
ctgtttgcgc gggcggcgaa attgccgcgc attgaaatcg cccgcccga tgatatcatc 540
ggcaaaaata cggtcagcgc catgcaagcc ggtattttat acggttatgt cggacaagt 600
gaaggcatcg tgctgcgaat gaaggcgaaa agcaaaatcc cgccgaagg gattgctact 660
ggcggtttg ctccgctcat tgccagcgaa tcggacatca tcgatgtcgt tgatccgttt 720
ttgacgctga ctggcttaaa attgttgtag gagaaaaaca ccgagaaaaa aggatga 777

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<210> 51

<211> 260

<212> PRT

<213> *Caulobacter crescentus*

<400> 51

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Met Leu Leu Ala Ile Glu Gln Gly Asn Thr Asn Thr Met Phe Ala Ile
  1               5              10             15

His Asp Gly Ala Ser Trp Val Ala Gln Trp Arg Ser Ala Thr Glu Ser
      20              25             30

Thr Arg Thr Ala Asp Glu Tyr Val Val Trp Leu Ser Gln Leu Leu Ser
      35              40             45

Met Gln Gly Leu Gly Phe Arg Ala Ile Asp Ala Val Ile Ile Ser Ser
      50              55             60

Val Val Pro Gln Ser Ile Phe Asn Leu Arg Asn Leu Ser Arg Arg Tyr
      65              70             75             80

Phe Asn Val Glu Pro Leu Val Ile Gly Glu Asn Ala Lys Leu Gly Ile
      85              90             95

Asp Val Arg Ile Glu Lys Pro Ser Glu Ala Gly Ala Asp Arg Leu Val
      100             105            110

Asn Ala Ile Gly Ala Ala Met Val Tyr Pro Gly Pro Leu Val Val Ile
      115            120            125

Asp Ser Gly Thr Ala Thr Thr Phe Asp Ile Val Ala Ala Asp Gly Ala
      130            135            140

Phe Glu Gly Gly Ile Ile Ala Pro Gly Ile Asn Leu Ser Met Gln Ala
      145            150            155            160

Leu His Glu Ala Ala Ala Lys Leu Pro Arg Ile Ala Ile Gln Arg Pro
      165            170            175

Ala Gly Asn Arg Ile Val Gly Thr Asp Thr Val Ser Ala Met Gln Ser
      180            185            190

Gly Val Phe Trp Gly Tyr Ile Ser Leu Ile Glu Gly Leu Val Ala Arg
      195            200            205

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Ile Lys Ala Glu Arg Gly Glu Pro Met Thr Val Ile Ala Thr Gly Gly  
 210 215 220

Val Ala Ser Leu Phe Glu Gly Ala Thr Asp Ser Ile Asp His Phe Asp  
 225 230 235 240

Ser Asp Leu Thr Ile Arg Gly Leu Leu Glu Ile Tyr Arg Arg Asn Thr  
 245 250 255

Ile Ala Glu Ser  
 260

<210> 52  
 <211> 783  
 <212> DNA  
 <213> *Caulobacter crescentus*

<400> 52  
 atgctgctgg ccattgagca gggcaacacc aacaccatgt tcgccattca tgatggcgca 60  
 tcgtgggtcg cgcagtggcg gtcagcgacc gaaagcacgc gcacggccga tgagtacgtc 120  
 gtctggcttt cgcaactgct gtcgatgcag gggcttggct tccgggcgat cgacgccgtg 180  
 atcatttcca gcgtcgtgcc gcagtcgac ttcaatctgc gcaacctgag ccgccgctac 240  
 ttcaacgctc agcctctggt catcgggtgag aacgccaaagc tgggcattga tgtccgcac 300  
 gagaaaccct ccgaggcccg cgccgaccgc ctgggtcaacg ccattggcgc ggcgatggtc 360  
 tatccgggtc cgctggctcg gatcgacagc ggcaccgcga cgacgttcga catcgtggcc 420  
 gccgacggcg ccttcgaggg cgggattatc gcgcccggta tcaacctgtc gatgcaggct 480  
 ctgcacgagg cggcggcgaa gctgccgcgc atcgccatcc agcgtcccgc cggtaacagg 540  
 atcgtgggca cggacacggt ctccgccatg cagtccggcg tcttctgggg ctatatattcg 600  
 ctgatcgaag gcctcgtcgc gcggatcaag gccgagcgcg gcgagcctat gaccgttatc 660  
 gccacgggtg gcgtcgcctc gctgttcgag ggcgcgaccg acagcattga ccacttcgac 720  
 tctgatctga cgatccgggg tcttctcgaa atctaccgcc gaaacaccat cgccgagtc 780  
 tga 783

<210> 53  
 <211> 257  
 <212> PRT  
 <213> *Chlorobium tepidum*

<400> 53  
 Met Arg Leu Val Val Asp Ile Gly Asn Thr Ser Thr Thr Leu Ala Ile  
 1 5 10 15

Phe Thr Gly Asp Glu Glu Pro Ser Val Glu Ser Val Pro Ser Ala Leu  
 20 25 30

Phe Ala Asp Ser Ser Thr Met Arg Glu Val Phe Gly Asn Met Ala Arg  
 35 40 45

Lys His Gly Glu Pro Gln Ala Ile Ala Ile Cys Ser Val Val Pro Ser  
 50 55 60

Ala Thr Ala Val Gly Ser Ala Leu Leu Glu Ser Leu Phe Ser Val Pro  
 65 70 75 80

Val	Leu	Thr	Ile	Cys	Cys	Lys	Leu	Arg	Phe	Pro	Phe	Arg	Leu	Asp	Tyr			
				85					90					95				
Ala	Thr	Pro	His	Thr	Phe	Gly	Ala	Asp	Arg	Leu	Ala	Leu	Cys	Ala	Trp			
			100					105					110					
Ser	Arg	His	Leu	Phe	Ser	Glu	Lys	Pro	Val	Ile	Ala	Val	Asp	Ile	Gly			
		115					120					125						
Thr	Ala	Ile	Thr	Phe	Asp	Val	Leu	Asp	Thr	Val	Gly	Asn	Tyr	Arg	Gly			
	130					135					140							
Gly	Leu	Ile	Met	Pro	Gly	Ile	Asp	Met	Met	Ala	Gly	Ala	Leu	His	Ser			
145					150					155					160			
Arg	Thr	Ala	Gln	Leu	Pro	Gln	Val	Arg	Ile	Asp	Arg	Pro	Glu	Ser	Leu			
			165					170						175				
Leu	Gly	Arg	Ser	Thr	Thr	Glu	Cys	Ile	Lys	Ser	Gly	Val	Phe	Trp	Gly			
			180					185					190					
Val	Val	Lys	Gln	Ile	Gly	Gly	Leu	Val	Asp	Ala	Ile	Arg	Gly	Asp	Leu			
		195					200					205						
Val	Arg	Asp	Phe	Gly	Glu	Ser	Thr	Val	Glu	Val	Ile	Val	Thr	Gly	Gly			
	210					215					220							
Asn	Ser	Arg	Ile	Ile	Val	Pro	Glu	Ile	Gly	Pro	Val	Ser	Val	Ile	Asp			
225					230					235					240			
Glu	Leu	Ala	Val	Leu	Arg	Gly	Ser	Asp	Leu	Leu	Leu	Arg	Met	Asn	Met			
			245						250					255				

Pro

<210> 54  
 <211> 774  
 <212> DNA  
 <213> Chlorobium tepidum

<400> 54

gtg	cgg	gct	gg	tcg	ttg	acat	cgg	caata	acc	agc	acg	acgt	tgg	cgatt	ttt	cacc	ggt	gat	60
gaag	agc	cg	gt	cga	gtc	ggt	acc	gag	t	gcg	ttg	ttt	ccg	att	ccag	caca	atg	cg	120
gaag	tgt	ttt	g	gca	acat	ggc	ccg	gaag	cac	ggc	gag	ccac	agg	ccat	cg	catt	tg	cag	180
gtg	gt	gc	ctt	ccg	ctac	cg	tcg	gtt	tcg	gcg	ctt	ctcg	aat	cact	ttt	ctcc	gt	acc	240
gtg	ctg	acca	tct	gct	gtaa	gct	ccg	ttt	t	cct	ttt	cg	tcg	act	acg	aac	ccc	gc	300
ac	ctt	cgg	cg	cga	tcg	ct	tg	cc	ctg	tg	gc	atg	gg	ag	cc	gac	at	ct	360
ccg	gtt	at	cg	ccg	tcg	atat	cgg	ca	gg	cc	atc	ac	ctt	cg	acg	tg	ct	cg	420
aatt	at	cg	cg	gtg	gt	ctcat	cat	g	ccg	gg	t	atc	gac	atga	tgg	ccg	gag	g	480
aga	acc	gccc	ag	ctt	cccc	ggt	g	cg	cat	c	gac	ag	gccc	g	ag	gc	ttt	ct	540
acg	acc	gaat	gc	atc	aaa	ag	cgg	ag	ttt	t	tgg	gg	ag	tgg	tcaa	ac	ag	at	600
gtg	gac	gcca	ttc	gcg	gcga	cct	tgt	acg	c	gact	ttg	ggc	agt	ca	acg	gt	cga	agt	660
gtc	acc	ggcg	gca	atag	cag	gatt	at	cg	tt	ccg	gag	atcg	gcc	ctg	tcag	tgt	tat	cg	720
gaact	cg	ctg	tc	ctg	cg	cg	cag	cg	at	ctt	ttg	ctg	cgga	tga	at	tg	cc	gtga	774

<210> 55  
 <211> 256  
 <212> PRT  
 <213> Clostridium difficile

<400> 55

Met	Leu	Leu	Val	Phe	Asp	Val	Gly	Asn	Thr	Asn	Met	Val	Leu	Gly	Ile	1	5	10	15
Tyr	Lys	Gly	Asp	Lys	Leu	Val	Asn	Tyr	Trp	Arg	Ile	Lys	Thr	Asp	Arg	20	25	30	
Glu	Lys	Thr	Ser	Asp	Glu	Tyr	Gly	Ile	Leu	Ile	Ser	Asn	Leu	Phe	Asp	35	40	45	
Tyr	Asp	Asn	Val	Asn	Ile	Ser	Asp	Ile	Asp	Asp	Val	Ile	Ile	Ser	Ser	50	55	60	
Val	Val	Pro	Asn	Val	Met	His	Ser	Leu	Glu	Asn	Phe	Cys	Ile	Lys	Tyr	65	70	75	80
Cys	Lys	Lys	Gln	Pro	Leu	Ile	Val	Gly	Pro	Gly	Ile	Lys	Thr	Gly	Leu	85	90	95	
Asn	Ile	Lys	Tyr	Asp	Asn	Pro	Lys	Gln	Val	Gly	Ala	Asp	Arg	Ile	Val	100	105	110	
Asn	Ala	Val	Ala	Gly	Ile	Glu	Lys	Tyr	Gly	Ala	Pro	Ser	Ile	Leu	Val	115	120	125	
Asp	Phe	Gly	Thr	Ala	Thr	Thr	Phe	Cys	Ala	Ile	Ser	Glu	Lys	Gly	Glu	130	135	140	
Tyr	Leu	Gly	Gly	Thr	Ile	Ala	Pro	Gly	Ile	Lys	Ile	Ser	Ser	Glu	Ala	145	150	155	160
Leu	Phe	Gln	Ser	Ala	Ser	Lys	Leu	Pro	Arg	Val	Glu	Leu	Ala	Lys	Pro	165	170	175	
Gly	Met	Thr	Ile	Cys	Lys	Ser	Thr	Val	Ser	Ala	Met	Gln	Ser	Gly	Ile	180	185	190	
Ile	Tyr	Gly	Tyr	Val	Gly	Leu	Val	Asp	Lys	Ile	Ile	Ser	Ile	Met	Lys	195	200	205	
Lys	Glu	Leu	Asn	Cys	Asp	Asp	Val	Lys	Val	Ile	Ala	Thr	Gly	Gly	Leu	210	215	220	
Ala	Lys	Leu	Ile	Ala	Ser	Glu	Thr	Lys	Ser	Ile	Asp	Tyr	Val	Asp	Gly	225	230	235	240
Phe	Leu	Thr	Leu	Glu	Gly	Leu	Arg	Ile	Ile	Tyr	Glu	Lys	Asn	Gln	Glu	245	250	255	

<210> 56  
 <211> 771

<212> DNA

<213> *Clostridium difficile*

<400> 56

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aaattagtta attactggag aattaaaaca gatagggaaa aaacgtctga tgaatatgga 120
atcctgataa gtaacctatt tgattatgat aatgtgaata taagtgatat tgatgatggt 180
ataatatcat ctgtagttcc gaatgttatg cattctcttg aaaacttttg tataaagtac 240
tgtaaaaaac agccattaat agtaggtcca ggcataaaaa caggtctaaa tataaaatat 300
gataatccaa aacaagttgg ggcagataga atagttaatg ctgtagcagg gatagaaaag 360
tatggagcac caagtatact tgttgatgtt ggaacagcaa ctacattttg tgctatctct 420
gaaaaagggtg aatattttggg tggacaata gcaccaggaa taaaaatatc tagtgaggcg 480
ttatttcaaa gtgcgtctaa attacctaga gtagaattag ctaagccagg tatgactatt 540
tgtaagagta ctgtatcagc catgcaatct ggaataattt atggatatgt tggtttagtt 600
gacaaaataa taagtattat gaagaaagaa ttgaattgtg atgatgttaa ggttatagct 660
acaggtggat tagctaaact gattgcttca gagacgaaaa gtatagatta tgtagatggt 720
tttttaacac tagaaggatt gagaataata tatgaaaaaa accaagaata a 771
```

<210> 57

<211> 219

<212> PRT

<213> *Dehalococcoides ethenogenes*

<400> 57

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Met Ser Glu Lys Leu Val Ala Val Asp Ile Gly Asn Thr Ser Val Asn
  1              5              10              15

Ile Gly Ile Phe Glu Gly Glu Lys Leu Leu Ala Asn Trp His Leu Gly
      20              25              30

Ser Val Ala Gln Arg Met Ala Asp Glu Tyr Ala Ser Leu Leu Leu Gly
      35              40              45

Leu Leu Gln His Ala Gly Ile His Pro Glu Glu Leu Asn Arg Val Ile
  50              55              60

Met Cys Ser Val Val Pro Pro Leu Thr Thr Thr Phe Glu Glu Val Phe
  65              70              75              80

Lys Ser Tyr Phe Lys Ala Ala Pro Leu Val Val Gly Ala Gly Ile Lys
      85              90              95

Ser Gly Val Lys Val Arg Met Asp Asn Pro Arg Glu Val Gly Ala Asp
     100              105              110

Arg Ile Val Asn Ala Ala Ala Ala Arg Val Leu Tyr Pro Gly Ala Cys
     115              120              125

Ile Ile Val Asp Met Gly Thr Ala Thr Thr Phe Asp Thr Leu Ser Glu
     130              135              140

Gly Gly Ala Tyr Ile Gly Gly Ala Ile Ala Pro Gly Ile Ala Thr Ser
     145              150              155              160

Ala Gln Ala Ile Ala Glu Lys Thr Ser Lys Leu Pro Lys Ile Glu Ile
     165              170              175
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Ile Arg Pro Ala Lys Val Ile Gly Ser Asn Thr Val Ser Ala Met Gln  
180 185 190

Ser Gly Ile Tyr Phe Gly Tyr Ile Gly Leu Val Glu Glu Leu Val Arg  
195 200 205

Arg Ile Gln Thr Glu Leu Gly Gln Lys Thr Arg  
210 215

<210> 58

<211> 659

<212> DNA

<213> Dehalococcoides ethenogenes

<400> 58

atgtctgaaa aactggtggc ggtagatatc ggcaataacca gcgtaaatat aggtatatatt 60  
gagggcgaaa aactgctggc aaactggcat ctgggttcgg ttgcccagcg tatggctgat 120  
gaatatgcca gtctgctctt aggcctgttg cagcacgccg gtatacacc ggaagagcta 180  
aacagggtaa tcatgtgcag tggtgtgccg cccctgacca ctacttttga agaggtattt 240  
aaaagctatt tcaaggctgc tcctctggta gtgggtgcag gtataaagag cgggggtaag 300  
gtgcgcatgg ataacccccg tgaggttggg gctgaccgca tagtaaatagc cgctgccgcc 360  
aggggtgcttt atccgggggc gtgcataata gtggacatgg gtacggccac tacctttgat 420  
accctttccg aggggtggggc atatataggc ggggcgattg cacccggtat tgccacctca 480  
gcccaggcta ttgcggaaaa gacttcaaaa ctgcccaga ttgagataat ccgtcctgcc 540  
aaagttatcg gctctaatac tgtgtcggct atgcagtcag gtatatactt cggttatata 600  
gggctggtgg aagagctggt caggcggatt caaactgaat tggggcagaa aaccagagt 659

<210> 59

<211> 212

<212> PRT

<213> Desulfovibrio vulgaris

<400> 59

Met Thr Gln His Phe Leu Leu Phe Asp Ile Gly Asn Thr Asn Val Lys  
1 5 10 15

Ile Gly Ile Ala Val Glu Thr Ala Val Leu Thr Ser Tyr Val Leu Pro  
20 25 30

Thr Asp Pro Gly Gln Thr Thr Asp Ser Ile Gly Leu Arg Leu Leu Glu  
35 40 45

Val Leu Arg His Ala Gly Leu Gly Pro Ala Asp Val Gly Ala Cys Val  
50 55 60

Ala Ser Ser Val Val Pro Gly Val Asn Pro Leu Ile Arg Arg Ala Cys  
65 70 75 80

Glu Arg Tyr Leu Tyr Arg Lys Leu Leu Phe Ala Pro Gly Asp Ile Ala  
85 90 95

Ile Pro Leu Asp Asn Arg Tyr Glu Arg Pro Ala Glu Val Gly Ala Asp  
100 105 110

Arg Leu Val Ala Ala Tyr Ala Ala Arg Arg Leu Tyr Pro Gly Pro Arg  
115 120 125

Ser Leu Val Ser Val Asp Phe Gly Thr Ala Thr Thr Phe Asp Cys Val  
130 135 140

Glu Gly Gly Ala Tyr Leu Gly Gly Leu Ile Cys Pro Gly Val Leu Ser  
145 150 155 160

Ser Ala Gly Ala Leu Ser Ser Arg Thr Ala Lys Leu Pro Arg Ile Ser  
165 170 175

Leu Glu Val Glu Glu Asp Ser Pro Val Ile Gly Arg Ser Thr Thr Thr  
180 185 190

Ser Leu Asn His Gly Phe Ile Phe Gly Phe Ala Ala Met Thr Glu Gly  
195 200 205

Val Leu Ala Ala  
210

<210> 60  
<211> 639  
<212> DNA  
<213> Desulfovibrio vulgaris

<400> 60  
atgacccagc atttcctgct gttcgacatc ggcaacacca acgtcaagat cggcatcgcg 60  
gtggaaaccg ccgtgctgac ttcgtacgtg ctgcccacag accccggcca gacgaccgac 120  
tccatcgggc tgcgcctgct ggaggtgctg cgccatgccg ggctgggacc ggcggacgtg 180  
ggggcctgcg tggccagttc ggtgggtgcc ggcgtaacc cgctgatccg ccgcgcctgc 240  
gaacgttacc tgtatcgcaa gctgctgttc gccccggcg acatcgccat tccgctggac 300  
aaccgctacg aacggccccg cgaagtgggc gcggaccggc tgggtggcggc ctatgccgcc 360  
cggcggtgtg accccggccc ccggtcgctg gtatccgtgg atttcggcac cgccaccacg 420  
tttgactgcg tggaaggggg tgcgtatctt ggtggtttga tctgtcccgg cgtgctgtcg 480  
tccgccgggg cgttgctgct gcgcacggcc aagctgccgc gcatcagttt ggaagtggaa 540  
gaggattcgc cggtcacgcg gcggtccacc accaccagcc tgaaccacgg cttcattttc 600  
ggctttgccg ccatgaccga aggggtgctg gccgcctga 639

<210> 61  
<211> 249  
<212> PRT  
<213> Pseudomonas putida

<400> 61  
Met Ile Leu Glu Leu Asp Cys Gly Asn Ser Phe Ile Lys Trp Arg Val  
1 5 10 15

Ile His Val Ala Asp Ala Val Ile Glu Gly Gly Gly Ile Val Asp Ser  
20 25 30

Asp Gln Ala Leu Val Ala Glu Val Ala Ala Leu Ala Ser Val Arg Leu  
35 40 45

Thr Gly Cys Arg Ile Val Ser Val Arg Ser Glu Glu Glu Thr Asp Ala

50		55		60
Leu Cys Ala Leu Ile Ala Gln Ala Phe Ala Val Gln Ala Lys Val Ala				
65		70		80
His Pro Val Arg Glu Met Ala Gly Val Arg Asn Gly Tyr Asp Asp Tyr				
	85		90	95
Gln Arg Leu Gly Met Asp Arg Trp Leu Ala Ala Leu Gly Ala Phe His				
	100		105	110
Leu Ala Lys Gly Ala Cys Leu Val Ile Asp Leu Gly Thr Ala Ala Lys				
	115		120	125
Ala Asp Phe Val Ser Ala Asp Gly Glu His Leu Gly Gly Tyr Ile Cys				
	130		135	140
Pro Gly Met Pro Leu Met Arg Ser Gln Leu Arg Thr His Thr Arg Arg				
	145		150	155
Ile Arg Tyr Asp Asp Ala Ser Ala Glu Arg Ala Leu Ser Ser Leu Ser				
	165		170	175
Pro Gly Arg Ser Thr Val Glu Ala Val Glu Arg Gly Cys Val Leu Met				
	180		185	190
Leu Gln Gly Phe Ala Tyr Thr Gln Leu Glu Gln Ala Arg Val Leu Trp				
	195		200	205
Gly Glu Glu Phe Thr Val Phe Leu Thr Gly Gly Asp Ala Pro Leu Val				
	210		215	220
Arg Ala Ala Leu Pro Gln Ala Arg Val Val Pro Asp Leu Val Phe Val				
	225		230	235
Gly Leu Ala Met Ala Cys Pro Leu Asp				
	245			

<210> 62  
 <211> 750  
 <212> DNA  
 <213> Pseudomonas putida

<400> 62  
 atgattcttg agctcgattg cggtaacagc ttcattcaagt ggcggggtgat ccatgttgcc 60  
 gatgctgtga ttgaaggtgg tgggatcgtc gattccgata aggcgctggg ggcggaagtg 120  
 gctgcgctcg cttcagtgcg tctcacgggt tgccgtattg tcagtgtgcg cagcgaagaa 180  
 gagaccgatg cgctttgcmc gttgattgct caggcatttg ccgtgcaggc gaagggtgcc 240  
 caccctgtcc gtgaaatggc aggtgtgcmc aatggctatg acgactatca gcgcctgggt 300  
 atggatcggt ggctggcggc gttgggggca tttcacctgg ccaagggcgc gtgcctgggtg 360  
 attgacctgg gtaccgcggc aaaagcggac ttcgtttctg cagatggcga gcatcttggg 420  
 ggctacatct gccaggtat gccattgatg cgtagccagc tgcgcactca caccgctcgg 480  
 atccgctatg acgatgcctc cgcggagcgc gcattgagca gcttgctacc aggtcgctcg 540  
 actgtcgaag cggtagagcg cggttgcgta ttgatgctcc agggctttgc ctacaccag 600  
 cttgagcagg ctcggtgtgct atgggggtgag gagttcaccg tgttcctcac tggcggtgat 660

gcgccactgg tgagggcggc cctgccacag gcgcggggtcg tgcctgacct gggttttcgtt 720  
 ggccctggcaa tggcttgccc attggattga 750

<210> 63  
 <211> 241  
 <212> PRT  
 <213> *Thiobacillus ferrooxidans*

<400> 63

Met	Ile	Phe	Ile	Ala	Val	Gly	Asn	Thr	Arg	Thr	Leu	Leu	Ala	His	Thr
1				5					10					15	
His	Asp	Gly	Val	His	Phe	Asp	Ser	Val	Ser	Val	Ala	Thr	Ser	Leu	Pro
			20					25					30		
Pro	Thr	Glu	Ile	Leu	Gln	Gln	Pro	Gly	Leu	Thr	Trp	Leu	Ser	Ala	Pro
		35					40					45			
Asn	Arg	Glu	Pro	Val	Ala	Leu	Gly	Gly	Val	Val	Pro	Ala	Ala	Leu	Ala
	50					55					60				
Ala	Trp	Arg	Glu	Ala	Leu	Ala	Thr	Ala	Glu	Val	Arg	Glu	Pro	Asp	Pro
65					70					75					80
Gly	Phe	Phe	Arg	Arg	Ala	Val	Pro	His	Asp	Tyr	His	Pro	Pro	Glu	Ser
				85					90					95	
Leu	Gly	Phe	Asp	Arg	Arg	Cys	Cys	Leu	Leu	Ala	Ala	Ala	Met	Asp	Tyr
			100					105					110		
Pro	Gly	Gln	Asp	Ser	Ile	Val	Ile	Asp	Met	Gly	Thr	Ala	Ile	Thr	Ile
		115					120					125			
Asp	Leu	Leu	Ala	Gly	Gly	His	Phe	Arg	Gly	Gly	Arg	Ile	Leu	Pro	Gly
	130					135					140				
Ile	Ala	Met	Ser	Leu	Arg	Gly	Leu	His	Glu	Gly	Thr	Ala	Leu	Leu	Pro
145					150					155					160
Glu	Val	Val	Leu	Asn	Ala	Pro	Ala	Glu	Met	Leu	Gly	Asn	Asp	Thr	Ser
				165					170					175	
Asn	Ala	Ile	Gln	Ala	Gly	Val	Ile	His	Leu	Phe	Ala	Asp	Ala	Leu	Arg
			180					185					190		
Gly	Ala	Ile	Thr	Asp	Phe	Arg	Gln	Tyr	Ser	Pro	Gln	Ala	Arg	Ile	Leu
		195					200					205			
Ile	Thr	Gly	Gly	Asp	Ala	Glu	Arg	Trp	Gln	Pro	Gly	Ile	Ala	Gly	Ser
	210					215					220				
Leu	Tyr	Gln	Pro	His	Leu	Leu	Leu	Arg	Gly	Phe	Tyr	Leu	Trp	Ile	Arg
225					230					235					240

Gly



<210> 64  
 <211> 726  
 <212> DNA  
 <213> *Thiobacillus ferrooxidans*

<400> 64  
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 catttcgaca gcgtcagcgt ggccacttcg ctgccacca cggaaatcct gcagcagccc 120  
 ggcttgacat ggctcagcgc gccgaaccgg gaaccgcgtc cgctgggcgg cgtcgtacct 180  
 gcggcgcttg ccgcctggcg ggaagccttg gccacggcag aggtccgcga acccgacccc 240  
 ggcttttttc gccgcgccgt gccgcacgac tatcatccgc cggaaagcct cggctttgac 300  
 cgccgttgct gcctgctcgc cgccgccatg gactaccccg gccaggacag catcgtcatc 360  
 gacatgggca ccgccatcac catcgacctg ctggctggcg gacatttccg gggcggacgc 420  
 attctgccgg gtatcgccat gagcctgcgc ggtctgcatg aaggcacggc actccttcct 480  
 gaagtcgtcc tgaacgcccc agcggaaatg ctgggcaatg acaccagcaa cgccattcag 540  
 gccgggggtca tccacctctt tgccgatgcc ctgcgcggcg ccattaccga ctttcgccag 600  
 tacagccccc aggcacggat actgatcacc ggtggcgatg ccgaacgttg gcaaccgcgc 660  
 atcgtctgta gcctgtacca gcccacatctg cttctgcgcg gcttttatct gtggatacgg 720  
 ggatga 726

<210> 65  
 <211> 242  
 <212> PRT  
 <213> *Xylella fastidiosa*

<400> 65  
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 Thr Glu Thr Met Asp Ala Phe Ala Leu Gln Glu Leu Pro Arg Gly Arg  
 35 40 45  
 Val Ala Tyr Leu Ala Ser Val Ala Ala Pro Ala Ile Thr Thr His Val  
 50 55 60  
 Leu Glu Val Leu Lys Ile His Phe Glu Gln Val Gln Val Ala Ala Thr  
 65 70 75 80  
 Val Ala Ala Cys Ala Gly Val Arg Ile Ala Tyr Ala His Pro Glu Arg  
 85 90 95  
 Phe Gly Val Asp Arg Phe Leu Ala Leu Leu Gly Ser Tyr Gly Glu Gly  
 100 105 110  
 Asn Val Leu Val Val Gly Val Gly Thr Ala Leu Thr Ile Asp Leu Leu  
 115 120 125  
 Ala Ala Asn Gly Cys His Leu Gly Gly Arg Ile Ser Ala Ser Pro Thr  
 130 135 140  
 Leu Met Arg Gln Ala Leu His Ala Arg Ala Glu Gln Leu Pro Leu Ser  
 145 150 155 160

Gly Gly Asn Tyr Leu Glu Phe Ala Glu Asp Thr Glu Asp Ala Leu Val  
165 170 175

Ser Gly Cys Asn Gly Ala Ala Val Ala Leu Ile Glu Arg Ser Leu Tyr  
180 185 190

Glu Ala His Gln Arg Leu Asp Gln Ser Val Arg Leu Leu Leu His Gly  
195 200 205

Gly Gly Val Ala Ser Leu Leu Pro Trp Leu Gly Asp Val Val His Arg  
210 215 220

Pro Thr Leu Val Leu Asp Gly Leu Ala Ile Trp Ala Ala Val Ala Ala  
225 230 235 240

Asn Val

<210> 66  
<211> 729  
<212> DNA  
<213> Xylella fastidiosa

<400> 66  
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<210> 67  
<211> 223  
<212> PRT  
<213> Helicobacter pylori

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20 25 30  
Ser Ser Ala Lys Glu Asp Leu Lys Arg Leu Gly Ile Gln Lys Glu Ile  
35 40 45  
Phe Tyr Ile Ser Val Asn Glu Glu Asn Glu Lys Ala Leu Leu Asn Cys  
50 55 60

Tyr Pro Asn Ala Lys Asn Ile Ala Gly Phe Phe His Leu Glu Thr Asp  
 65 70 75 80  
 Tyr Val Gly Leu Gly Ile Asp Arg Gln Met Ala Cys Leu Ala Val Asn  
 85 90 95  
 Asn Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile Asp Leu Ile  
 100 105 110  
 Lys Glu Gly Lys His Leu Gly Gly Cys Ile Leu Pro Gly Leu Ala Gln  
 115 120 125  
 Tyr Ile His Ala Tyr Lys Lys Ser Ala Lys Ile Leu Glu Gln Pro Phe  
 130 135 140  
 Lys Ala Leu Asp Ser Leu Glu Val Leu Pro Lys Ser Thr Arg Asp Ala  
 145 150 155 160  
 Val Asn Tyr Gly Met Val Leu Ser Val Ile Ala Cys Ile Gln His Leu  
 165 170 175  
 Ala Lys Asn Gln Lys Ile Tyr Leu Cys Gly Gly Asp Ala Lys Tyr Leu  
 180 185 190  
 Ser Ala Phe Leu Pro His Ser Val Cys Lys Glu Arg Leu Val Phe Asp  
 195 200 205  
 Gly Met Glu Ile Ala Leu Lys Lys Ala Gly Ile Leu Glu Cys Lys  
 210 215 220

<210> 68  
 <211> 672  
 <212> DNA  
 <213> *Helicobacter pylori*

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<210> 69  
 <211> 750  
 <212> DNA  
 <213> *Pseudomonas syringae*

<400> 69

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<210> 70

<211> 249

<212> PRT

<213> *Pseudomonas syringae*

<400> 70

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Ile Thr Lys Ser Cys Ser Thr Leu Val Ser Gly Gly Val Val Asp Ser
 20             25             30

Asp Thr Ala Leu Leu Glu Cys Leu Gly Asn Leu Ser Gly Ala Ala Phe
 35             40             45

Ser Asp Cys Arg Leu Val Ser Val Arg Ser Ala Glu Glu Thr Ala Lys
 50             55             60

Leu Val Cys Ala Leu Ala Asp Thr Phe Ser Ile Ser Pro Val Cys Ala
 65             70             75             80

Ala Pro Ala Pro Glu Leu Ala Gly Val Ile Asn Gly Tyr Asp Asp Phe
 85             90             95

Ala Arg Leu Gly Leu Asp Arg Trp Leu Ala Phe Val Gly Ala Tyr His
100             105             110

Leu Val Lys Gly Ala Cys Leu Val Ile Asp Leu Gly Thr Ala Ile Thr
115             120             125

Ser Asp Phe Val Glu Ala Ser Gly Lys His Leu Gly Gly Phe Ile Cys
130             135             140

Pro Gly Met Pro Leu Met Arg Asn Gln Leu Arg Thr His Thr Arg Arg
145             150             155             160

Ile Arg Tyr Asp Asp Ala Glu Ala Glu Lys Ala Leu Val Arg Leu Val
165             170             175

Pro Gly Arg Ala Thr Ala Glu Ala Val Glu Arg Gly Cys Ser Leu Met
180             185             190
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Leu Arg Gly Phe Ala Met Thr Gln Ile Glu Ile Ala Arg Glu Tyr Trp  
 195 200 205  
 Gly Asp Asp Phe Ala Ile Phe Val Thr Gly Gly Asp Ala Val Leu Val  
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 Ala Asp Val Leu Pro Gly Ala Arg Ile Val Pro Asp Leu Val Phe Val  
 225 230 235 240  
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<210> 71  
 <211> 8320  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: plasmid, pAN296

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<210> 72

<211> 6688

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid, pAN336

<400> 72

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6688

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<211> 9396

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid, pAN341 and pAN342

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<211> 3964

<212> DNA

<213> Artificial Sequence

<220>



<223> Description of Artificial Sequence: plasmid, pOTP71

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<211> 3859

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid, pOTP72

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<211> 3934

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid, pOTP73

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